Chemical Week

May 28, 1955

Price 35 cents

When you're fighting Communism, employee relations loom large; here's one approach . . . . p. 20

Four-step purification process upgrades scheelite at new tungsten refinery . . . . . p. 42

Chemotherapeutic agents may help combat mental illness, No. 1 public health problem . . . p. 66

Needs for chlorine keep raising caustic production, but what will boost caustic demand? . . . p. 85

There's no stopping aerosols; just-reported '54 survey shows 32% gain over '53 .

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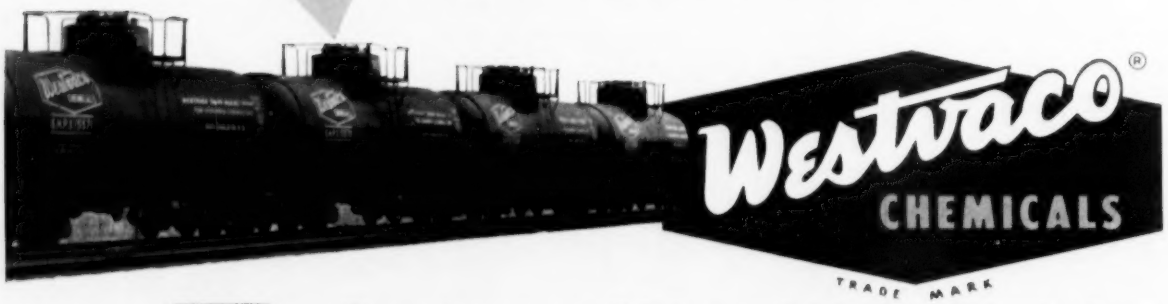

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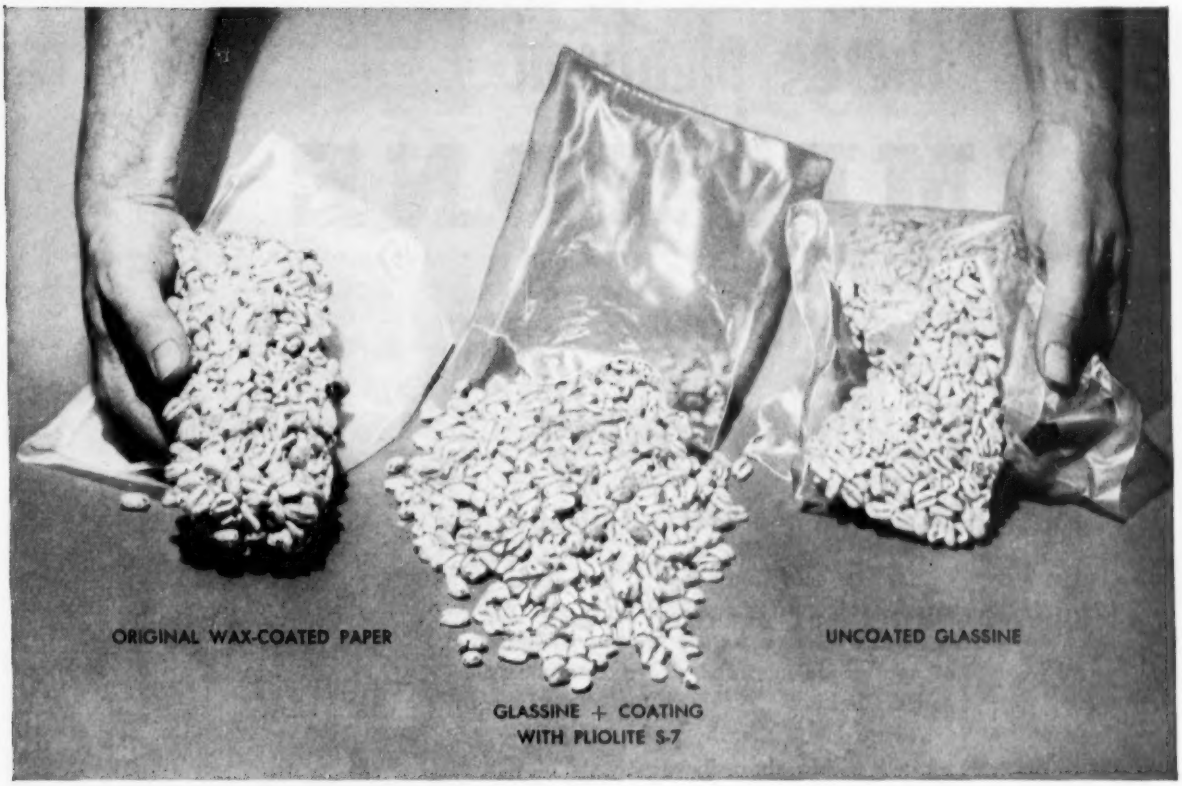

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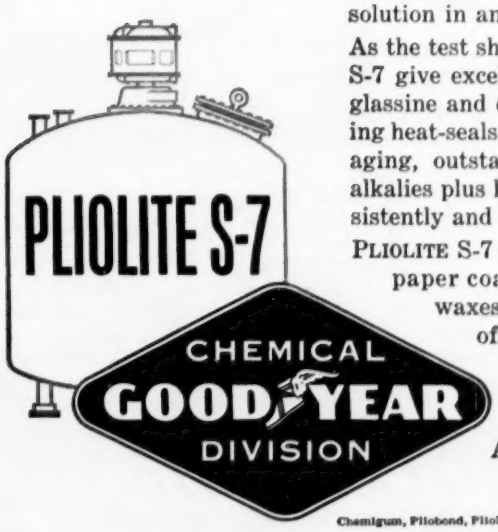

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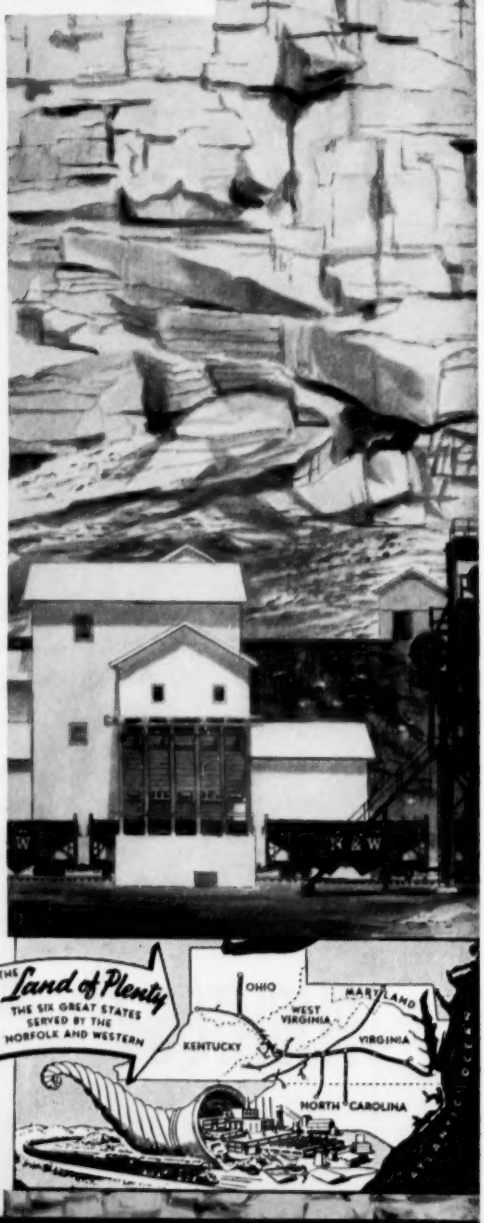

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Chemical Week

Volume 76 — May 28, 1955 — Number 22

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Chemical Week (including Chemical Specialties and Chemical Industries) is published weekly by McGraw-Hill Publishing Company, Inc. James H. McGraw (1860-1948), founder. Executive, Editorial and Advertising Offices: McGraw-Hill Building, 330 W. 42nd St., New York 36, N. Y. Publication Office: 1309 Noble St., Philadelphia 23, Pa. Donald C. McGraw, President; Paul Montgomery, Executive Vice-President; Joseph A. Gerardi, Vice-President and Treasurer; John J. Cooke, Secretary; Nelson Bond, Executive Vice-President, Publications Division; Ralph B. Smith, Vice-President and Editorial Director; Joseph H. Allen, Vice-President and Director of Advertising; J. E. Blackburn, Jr., Vice-President and Circulation Director.

Subscriptions to Chemical Week are solicited from management men in the chemical process industries. Position and company connection must be indicated on subscription order. Address all subscription communications to Chemical Week Subscription Service, 330 W. 42nd St., New York 36, N. Y., or 1309 Noble St., Philadelphia 23, Pa. Allow one month for change of address.

Single copies 25¢ except Annual Buyer's Guide issue, priced at $2.50. Subscription rates—United States and Possessions $5.00 a year; $8.00 for two years; $10.00 for three years. Canada $6.00 for a year; $10.00 for two years; $13.00 for three years. Other Western Hemisphere Countries $15.00 a year; $25.00 for two years; $30.00 for three years. All other countries $25.00 a year; $40.00 for two years; $50.00 for three years. Entered as second class matter December 20, 1951, at the Post Office at Philadelphia 23, Pa., under the act of March 3, 1879. Printed in U.S.A. Copyright 1955 by McGraw-Hill Publishing Co. Inc.—All rights reserved.

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OPINION . . . . . .

Rate Your Plant's PVQ

Do you hurriedly show your visitors a maze of pipes, valves, tanks, machines, **reactors, autoclaves, etc., and** say with a brief explanation, "This is our plant"? If you do, your PVQ (plant visitor's quotient) is about zero. You are unwittingly undoing much of the work that your public relations and advertising departments have done to enhance the name of your company.

People who come to visit your plant expect to get something for their efforts. Do you supply that something?

Today, as perhaps never before, we need to emphasize the importance and nature of the chemical industry to people of all ages. Only through such a program can sufficient interest be developed and maintained in chemistry, so that we will have the raw material (in terms of manpower) to meet the demands of industry. Are you doing your share?

Recall the nature of your treatment of **plant visitors. Are you really** helping them and your company?

1. Do you give your visitors a flow sheet of the operations they will see?
   a) Do you talk over the flow sheet and the things they will see, before beginning the tour?
   b) Do you follow this flow sheet on the tour?
2. If you have no flow sheet,
   a) Do you **follow some natural sequence of operations that the uninitiated** can follow?
   b) Do you **tell them what to** anticipate in their trip?
3. Do you send "carnival barkers" out as tour directors (memorized patter, delivered rapidly without affecting the minds of anyone involved)?
4. Do you try to talk "over and above" the normal plant noise?
   a) Do you divide into groups of five or less?
   b) Do you divide into groups as conductors are available?
5. Do you use nomenclature and terminology that is appropriate to the group?
   a) Do you explain "new words"?
   b) Do you "talk down" to the uninitiated?
   c) Do you wise-crack at or slur any individual or processes seen?
   d) Are you specific?
   e) Do you attempt to gain the confidence of the visitors so they will feel free to ask questions?
6. Do you rush through your tour?
   a) Do you stop and buy a **Coke?**
   b) Do you give them time to rest and ask questions?
   c) Do you get a "kick" out of showing visitors your plant?
7. At the conclusion of the tour do you summarize their visit—
   a) by giving the visitor some literature on your operations?
   b) by giving the visitor some samples of your product?

If you cannot answer most of these questions with the welfare of the visitor *first* in your mind, your program of plant visitation is in need of renovation.

How's your PVQ?

To the Editor: I am writing as a college chemistry professor who has enjoyed using plant visits as a valuable stimulus to his potential teachers, technicians, researchers, doctors, dentists, etc.—protesting some of the too common procedures and attitudes used in chemical plants relative to plant visitation.

It is my opinion that you could and should develop such a topic to help educate the personnel in charge of these programs. In fact I am enthusiastic and presumptuous enough to include some ideas of mine. Perhaps they will be of interest. . . .

W. G. Kessel
Assistant Professor of Chemistry
Indiana State Teachers College
Terre Haute, Ind.

Spectro Chems

To the Editor: In your recent article (*May 7*), the need for reagents of increased purity for use in spectrophotometry was discussed. Mention was made that there is . . . a real need in research for . . . methanol, isopropanol . . .

We believe your readers would like to know that these two items are currently available through laboratory supply houses . . . among many others we have designed and labeled for spectrophotometric use.

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TVA Mixer

To the Editor: We noted with interest your news article (*April 30, p. 18*) on production facilities owned by co-ops, having recently completed erection of the Illinois Farm Supply Co.'s 50,000-tons/year fertilizer plant at Tuscola, Ill.

You described it, however, as an ammonium phosphate plant. It actually is a fertilizer mix plant, employing the TVA-developed continuous ammoniator to continuously produce high-analysis granular material . . .

James E. Iliff
Chief Process Engineer
Blaw-Knox Co.
Chicago

Down With Co-ops

To the Editor: We were impressed by the news article "Co-ops Go Big Time" (*April 30*) and for mainly one reason: You apparently do not fully understand the real problem which ordinary business concerns face in attempting to compete with cooperatives, i.e., the tax-favored treatment accorded cooperatives under the Internal Revenue Code and through Treasury rulings. You apparently do

Anhydrous ammonia is hauled in this Fruehauf Truck-Full Trailer operating on the West Coast. Twin-cylinder Semi-Trailers have also been designed for the rapidly-growing liquid fertilizer industry, where Fruehaufs are extensively used because of their mobility, dependability, and economy.

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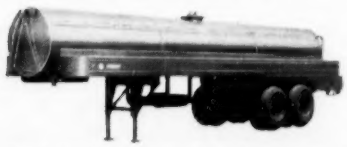

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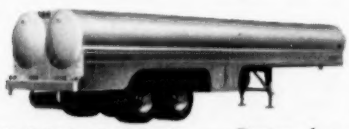

Twin Cylinder Tank-Trailers — Designed to haul propane, butane, anhydrous ammonia.

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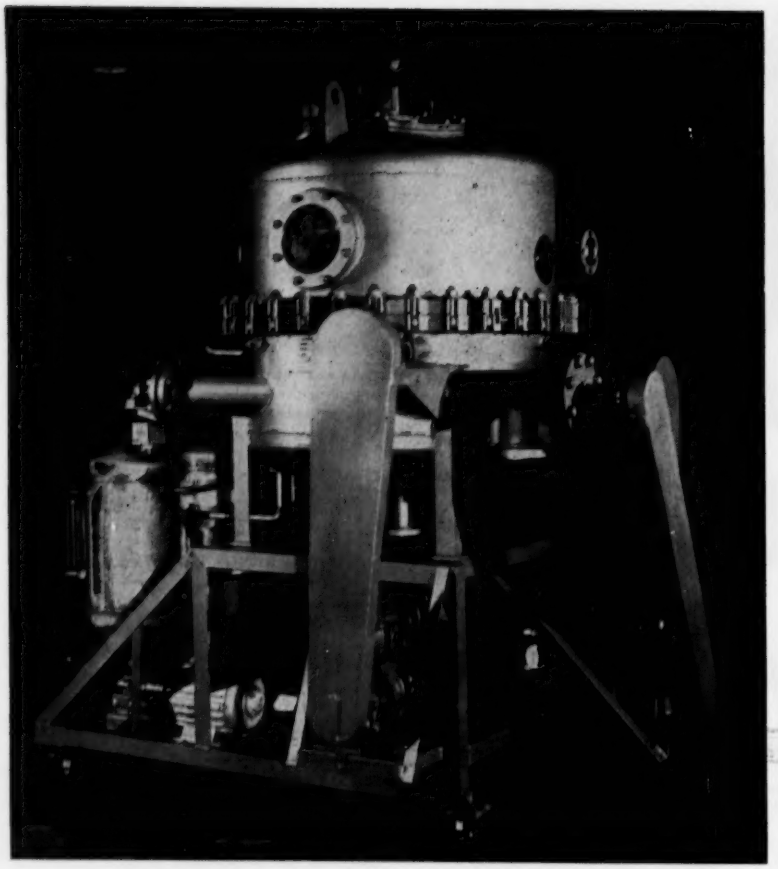

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B-108

You Can't Beat An Eimco!

OPINION . . . . . .

not realize that cooperatives can escape payment of all federal income taxes at the corporate level, and certainly most of them take advantage of the situation.

We would like to point out that the tremendous growth of cooperatives and their expansion into almost every phase of industrial life has been accomplished largely with tax-free earnings. Regular taxpaying businesses would have nothing to fear in competition with cooperatives, large or small, if cooperative corporations had to pay the same federal income tax as other corporate businesses. . . .

DUPUY BATEMAN, JR.
Vice-Chairman
Public Information Committee
of the Cotton Industries
Dallas, Texas

Our April 30 news article was concerned solely with a statistical reporting of the growth of cooperatives and we did not, therefore, include any reference to the subject of tax advantages. We are, however, familiar with the tax situation, have published several news stories analyzing that matter.—ED.

DATES AHEAD . . .

Chemical Institute of Canada, annual conference, Quebec City, May 30-June 1.

World Petroleum Congress, Rome, Italy, June 6-15.

Manufacturing Chemists' Assn., annual outing with SOCMA, Greenbrier Hotel, White Sulphur Springs, W. Va., June 9-11.

National Plant Food Institute, Greenbrier Hotel, White Sulphur Springs, W. Va., June 12-15.

Armed Forces Chemical Assn., annual meeting, Cleveland Hotel, Cleveland, June 16-17.

Forest Products Research Society, national meeting, Olympic Hotel, Seattle, June 20-23.

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: W. A. Jordan, Chemical Week, 330 W. 42nd St., New York 36, N. Y.

INVITATION TO PIONEER

V-C organophosphorus compounds, such as those listed at right, have created new horizons for the progressive chemist, because of unsurpassed versatility in useful applications.

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Trihexyl phosphite†
Triisooctyl phosphite†
Tris(2-ethylhexyl) phosphite†
Tris(2-chloroethyl) phosphite
2-ethylhexyl octylphenyl phosphite
Tricresyl phosphite

Phosphonates

Diethyl ethylphosphonate
Dibutyl butylphosphonate
Bis(2-ethylhexyl) 2-ethylhexylphosphonate

Phosphorothioates

O,O,O-Triethyl phosphorothioate
O,O,O-Tributyl phosphorothioate
O,O,O-Triisooctyl phosphorothioate

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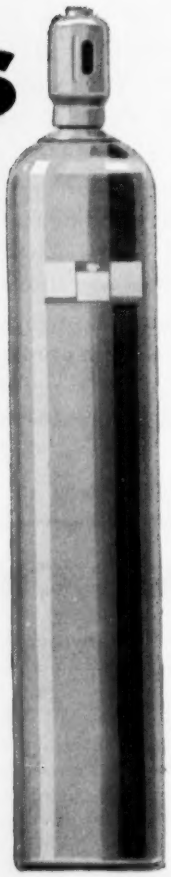

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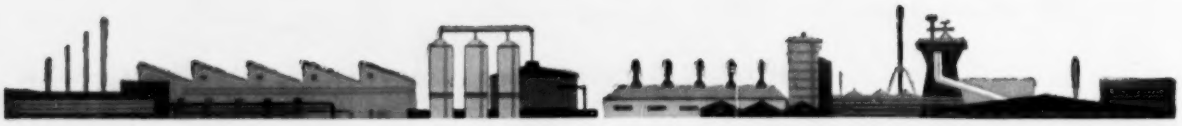

NEWSLETTER

Word from Washington this week is that all is not balmy and blissful with Diamond Alkali and its operation of the government-owned Pine Bluff, Ark., chlorine plant.

Diamond officials won't comment, but insiders believe that when it managed to get its Muscle Shoals plant in operation, Diamond didn't need chlorine from Pine Bluff, especially under terms of its present operating contract. Result: a new contract is now being negotiated—but is still far from the signing stage.

•

On persistent report that Olin Mathieson and Phillips Petroleum are talking merger terms: a firm denial from Phillips President Paul Endacott, and an equally negative nod from top Olin Mathieson spokesmen.

•

Also in the report-contradicting department: an upcoming government manpower survey will deflate stories of general shortages of scientists and engineers in industry. Bound to stir up a controversy, the survey will claim: scientist-engineer shortages are exaggerated; the only real need is for persons with experience in very narrow specialties; there's no lack of young engineers fresh from college.

Sure to be elated: military men, who have long fought special treatment for draft-age scientists.

•

Virtually assuring continued operation of the Texas City tin smelter for another year, the House Banking & Currency Committee has passed the same recommendation okayed by the Senate several weeks ago. Next step: passage by a full House vote. Outlook: little or no solid opposition.

•

At least one of the small chemical companies involved in a hassle with the Korean government seems to have worked itself out of trouble. Its name: Southern Fertilizer and Chemical Co. (Savannah, Ga.).

Company spokesmen now say the firm has had a bid for 10,000 metric tons of fertilizer accepted; written contracts should be signed within the week.

Confusion, it seems, stemmed from the fact that Southern Fertilizer had not been dealing with the approved broker in Seoul; once the firm consented to "go through" approved channels, it got its award.

•

Flanders Mining Co. (Grand Junction, Colo.), is expanding into potash. It has acquired a five-year lease on over 15,000 acres of state land in the potash region of Eddy County, Colo., and obtained a prospecting permit on an additional 50,000 acres of Spanish grant land.

•

Kawecki Chemical Co. (Boyertown, Pa.) is studying the feasibility of a native selenium-ore processing plant in the Lysite area, near Shoshoni, Wyo. Selenium is currently obtained mainly as a by-product of copper processing. Involved in preliminary discussions: representatives of

the Natural Resources Research Institute at the University of Wyoming.

•

The week brought several other technical developments, too:

At Philadelphia, reports—labeled "premature" by the company—leaked out that Merck's Sharp & Dohme division was ready to market its prednisone arthritic drug under the tradename Deltra. Merck confirms that this tradename will be used, but says the product has not yet been released for sale. When Deltra hits the market, it may precipitate a fracas (*CW, Feb. 12, p. 46*) with Schering, whose Meticorten brand prednisone came out last November.

At Jersey City, Onyx Oil & Chemical brought out a new, still-secret process that's said to permit commercial production of fatty acid diethanolamine condensates in virtually pure form.

•

Up for sale to the highest bidder: the Tennessee Valley Authority's Godwin phosphate plant and 406-acre site near Columbia, Tenn.

The plant, which includes facilities to process about 1,800 tons/day of phosphate matrix for phosphate sand recovery, has been on "stand-by" status since 1949. Last July, however, TVA made it known that it would sell the facility when—and if—a firm offer came along.

Now one offer has been made, and TVA will put the plant up for public auction June 6.

•

A full-scale review of the government's plant expansion goals for defense-related industries is under way this week. Field survey data are due at the Office of Defense Mobilization by mid-June, whereupon a reappraisal of the entire plant expansion program will be made.

Unofficially, here's how chemical, or chemical-related goals now shape up: synthetic methanol expansion is now substantially completed; glycerine and titanium metal are progressing well toward completion; titanium melting facilities have made fair progress; titanium processing expansion, poor development. The alkylate goal is also open—but the goal itself and status of present expansion are both classified.

All other chemical goals are closed, and unless the ceiling is hiked, will permit no more fast tax write-offs.

•

Up for decision in a Senate subcommittee hearing on federal housing this week: whether the government should guarantee loans for installation of air-pollution abatement equipment. Outlook: fair to good for passage.

•

How arbitrary can one official get? That's the question behind the request by Tennessee Products & Chemical Corp. that Chattanooga's city council pass an ordinance setting specific quantitative regulations on discharge of industrial wastes into the air.

Several years ago, the company put up—at considerable expense—a tall smoke stack that reduced to "negligible" proportions the dust coming from its plant; but people could still see the smoke, so complaints have continued. Now the company believes it has the answer in a new filter being tested at the firm's Houston plant—but before committing itself to "a large capital outlay and increased cost of operations," Tennessee Products wants the city to put numerical discharge standards into the law so that no individual official will be able to insist on standards that would make installation of the new equipment a total loss of effort.

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Inland "protection-eering" keeps the

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BUSINESS & INDUSTRY. . .

CMRA SPEAKERS*: Foresee major expansion in all sectors of industry.

No Sinkholes Ahead

Right in line with the heady economic predictions of unlimited prosperity for U.S. industry in the years ahead, chemical market research men are predicting sharp gains in chemical sales through 1960.

According to their estimates, however, the chemical industry won't be growing at a rate comparable to that of the past five years. Reason: apart from its natural tendency to expand, the chemical industry in recent years has been spurred by war shortages, the Korean conflict, and unusual population increases.

Meeting last week (483 strong) at New York's Hotel Plaza, these are some of the highlights market researchers say they expect:

• Sharp increases in plastic sales. In particular: demand for vinyls should increase to 2,676 million lbs. by 1960; polystyrene sales total should soar to 1,407 million lbs.; polyethylene sales should be 627 million lbs.; phenolics, 521.7 million lbs.; and urea and melamine, 340 million lbs.

• Good gains for cyclic intermediates. Total U.S. production of cyclic intermediates by 1960 should reach 10,000 million lbs.; styrene alone should top 1,100 million lbs., phenol, 710 million lbs., phthalic anhydride, 580 million lbs.

• Steady growth for lakes and toners. By 1960, total U.S. production should hit 66 million lbs.

• Big spurt for synthetic organic plasticizers. By 1960, the total U.S. output will top 470 million lbs.

• In inorganic chemicals, production should increase 25% by 1960. That means close to a $2.75-billion/year business at current price standards.

• In drug sales, Chemical Market Research Assn. spokesmen state, predictions are dangerous indeed. Why? Changing product mix and the general price history of pharmaceuticals make neat statistical projections hazardous. There is, claims Edmund Swanberg, of Scudder, Stevens and Clark, even some evidence that competition in this sector of the chemical process industries may degenerate into a dog-eat-dog pattern. If that happens, the growth potential of drug companies will suffer accordingly.

• Fertilizers will continue to find a growing market in the U.S. even though farm prosperity remains unchanged, says Arthur D. Little's Messing. Basic reason: only 25% of the total crop land in the country receives any application of fertilizer materials today.

* Left to right: Arthur D. Little's Richard Messing, McGraw-Hill's Dexter Keezer, Monsanto's Shea Smith, and Du Pont's Keller.

No Grab for Tab

Up to this week, the move to have the U.S. government pick up the tab for all damages resulting from the 1947 fertilizer explosion at Texas City, Tex., has been received only with reluctance by Administration officials.

Rep. Clark Thompson and other Texas congressmen are sponsoring bills that would require the government to pay certain claims arising from the ammonium nitrate blast; but at a recent House committee hearing, several high officers of the Eisenhower Administration testified against the measure.

Assistant Attorney-General Warren Burger attacked the proposal as a "$100-million give-away" that's "too wide open." He said the bill sets no limit on claims that might be filed, merely sets up a three-member commission to review the claims and fix payments. Burger estimated that some $40 million would be paid to insurance companies under the bill, and that lawyers for those companies might receive $6 million in fees.

He insisted that federal responsibility for the explosion and fires has never been clearly defined, but indicated that the Justice Dept. might drop its opposition if the bill were amended to authorize payment only to individuals and to limit payments to possibly $10,000 or $20,000 in each case.

The fertilizer-grade ammonium nitrate (FGAN) that exploded had just been loaded onto a French cargo ship for shipment in connection with this nation's foreign-aid program. Damage included destruction of valuable chemical property, most of which, however, was insured.

FTC's Merger Scorecard 1948–1954

By Industry Group

	Number of Companies Acquiring Concerns	Number of Acquired Concerns
Nonelectrical machinery	166	249
Food and kindred products	100	243
Chemicals	**73**	**168**
Fabricated metals	91	161
Transportation equipment	66	125
Textiles and apparel	74	117
Electrical machinery	70	111
Nonmanufacturing	64	96
Mining	48	81
Primary metals	53	78
Stone, clay and glass products	**39**	**70**
Paper and allied products	**42**	**60**
Professional and scientific instruments	24	47
Lumber and furniture	31	40
Petroleum and coal products	**23**	**35**
Printing and publishing	15	24
Rubber products	**13**	**23**
Leather products	9	21
Miscellaneous manufacturing	18	20
Tobacco manufacturing	4	4

By Company

		Number of Acquisitions
Foremost Dairies	Food and kindred products	48
Olin Mathieson	**Chemicals**	**18**
Borden	Food and kindred products	17
Food Mach. and Chem.	**Chemicals**	**14**
H. K. Porter	Fabricated metals	13
Burlington Mills	Textiles	12
American Marietta	**Chemicals**	**12**
American Mach. & Foundry	Nonelectrical machinery	11
Ekco Products	Fabricated metals	10
Pressed Steel Car Co.	Transportation equipment	8
National Dairy Products	Food and kindred products	8
McGraw Electric	Electrical machinery	8
Allied Chemical & Dye	**Chemicals**	**7**
National Lead	**Chemicals**	**7**
Textron	Textiles and apparel	7
General Shoe	Leather	7
Continental Can	Fabricated metals	7
Maremont Automotive Products	Transportation equipment	6
Merritt-Chapman & Scott	Nonmanufacturing	6
H & B American Machine	Fabricated metals	6
General Tire & Rubber	**Rubber products, chemicals**	**6**
Koppers	**Chemicals**	**6**
International Min. & Chem.	**Chemicals**	**6**
Airline Foods	Food and kindred products	6

Few Surprises, Heavy Documentation

The long-awaited economic report on mergers by the Federal Trade Commission confirms what most chemical company executives have known for some time: important merger activity in chemicals is on the upswing.

The 233-page, fact-crammed document, prepared after a four-month study by FTC's Bureau of Economics under Jesse W. Markham, documents the actual dimensions of the current merger movement. Here are some of the signficant facts disclosed:

• Mergers in chemicals between 1948 and 1954 ranked third highest of all industries (*see chart*);

• The chemical industry led all others in the number of companies on FTC's most-merging list, with seven companies picking up six or more other companies;

• Companies with assets in excess of $10 million accounted for more than 70% of the chemical mergers.

Other Indicators: The report shows that mergers generally increased in '54 to three times the '49 rate, are nearing the postwar peaks of 1946-47, but are still well below the pre-depression rate of the late 1920's. It undoubtedly is the best statistical measurement yet on the recent wave of mergers. Still, it offers practically no answer to such issues as:

• Are most of these mergers—or should they be—illegal?

• If so, what is to be done about them?

FTC itself may have some ideas on these issues. But the economic report gives no clue to any startling or drastic recommendations to come. Rather, it implies satisfaction with the statutory authority and procedures now used by

FTC in enforcing the 1950 antimerger law.

Why Merge? "On why companies merge," the report states that the underlying "economic forces and motives are not *per se* different from those upon which all business judgments are based respecting ownership and exchange of property in a free economy."

By contrast, proposals for dealing with mergers that are being presented in hearings on Capitol Hill by the Justice Dept.'s Antitrust Division go much further than anything discussed in the FTC report. But FTC says its report is designed to provide Congress, Justice, and FTC with the facts needed to determine what corrective action—if any—should be taken.

On this score, the report specifically discusses the Olin Mathieson amalgamation, describes it as "the merger of a large consumer and a large manufacturer of basic chemicals." It continues: "Prior to this merger and within the 43-month period, both companies had made acquisitions that provided a measure of integration. Mathieson had acquired five companies that would distribute or further process its basic chemicals, the largest by far being E. R. Squibb & Sons . . . Olin Industries, Inc., had acquired a large lumber company and a producer of natural gas. Three other acquisitions that further diversified the companies, and the purchase of one empty plant, round out the list. Combined net sales of the companies in '53 were over three times as large as Olin's sales in 1950, and over six times as large as Mathieson's."

This same study of mergers since the 1950 law has been in effect attempts an analysis of the various competitive advantages gained by the acquiring company through merging. By far the most frequent was addition of capacity to serve a market already supplied by the acquiring company (*see chart below*). But as in other areas of the report, no hint is made that this particular fact is a cause for concern.

Why Companies Merge

To add to production capacity	40%
To diversify	25%
To gain new sources of supply	12½%
To move into the consumer market	10%
To add to specific capacity	10%

In fact, FTC discusses four other reasons why companies merge, which are not counted as competitive factors. These include: (1) inability of small firms to command financing for expansion and modernization; (2) surplus cash in the hands of acquiring companies; (3) aging owners who want to retire; and (4) tax savings.

One special feature which should make the report interesting reading are the so-called case studies of the factors involved in specific recent mergers.

In addition: the FTC report analyzes the 1950 antimerger law and the six cases challenged under it by FTC and the Justice Dept. It makes no recommendations for tightening the law, but reviews the serious economic and legal problems involved in deciding whether a particular merger "may substantially lessen competition or tend to create a monopoly."

Under Watchful Eyes

What it means to operate under the watchful eye of the courts is exemplified this week in a new order filed in the government's gone-but-not-forgotten antitrust suit against Imperial Chemical Industries and Du Pont. One provision of Judge Sylvester Ryan's decree forbids Du Pont and ICI from licensing each other under any chemical patent for five years, unless they get prior permission from the court. With nearly three of those years elapsed, the two companies have to keep coming into court and letting the whole world know what they're doing when either firm wants a license from the other.

In the latest such instance, Du Pont received permission to negotiate for nonexclusive licenses under ICI's Rubenstein patent (No. 2,653,863) on initiating compositions containing lead azide, and under ICI's Australian patent application (No. 7576/52) relating to grafted acrylonitrile polymers.

Earlier, ICI got clearance to negotiate for licenses under two British patents owned by Du Pont: one on fused salt electrolysis (No. 668,691) and the other on poly-substituted metal ureas (No. 691,403).

WIDE WORLD

CHAIRMAN MAGNUSON: On natural gas pricing, he's in key slot.

By Remote Control

Taking away the shadow of direct control and leaving in its place the substance of price regulation via indirect control—that's the effect of the natural-gas bills pending this week in Congress.

The Harris bill in the House and the Fulbright bill in the Senate would free natural-gas producers from the price-fixing jurisdiction of the Federal Power Commission; but FPC would pick up authority over any changes in the rates that a pipeline company could pay to the producers. Sen. Warren Magnuson (D., Wash.)—whose Interstate Commerce Committee has been holding hearings on the bill—wants that authority to apply to "escalation clauses" in present as well as future contracts.

'Customer Quiz' Valid

On the antitrust trail, Crown-Zellerbach Corp. hit two jarring bumps during the past week:

- Overruling Crown - Zellerbach's motion, the Federal Trade Commission has decided that the survey of customers can be admitted as evidence in FTC's action against Crown-Zellerbach's 1953 merger with St. Helens Pulp & Paper Co. (*CW, May 7, p. 14*).
- One day earlier, the Justice Dept.'s Antitrust Division named Crown-Zellerbach as one of two defendants in a civil suit in Wisconsin,

charging restraint of trade in paper-towel cabinets and paper towels. The other defendant: American Linen Supply Co., which also was hit by two other antitrust suits in the same week.

In the antimerger action, a unanimous decision written by FTC Commissioner John Gwynne means that a survey of coarse-paper purchases by nearly 500 converters and jobbers in 11 Western states now can go into the record.

Further: Crown-Zellerbach will not be allowed to cross-examine any of those converters or jobbers, but it can argue about the import of the survey data.

EXPANSION . . .

Rayon Staple: American Enka Corp. is planning a 50-million-lb. rayon staple fiber unit at its Morristown, Tenn., plant. Cost: $20 million.

Construction work is scheduled to begin late this summer or early fall; production should start by the end of '56.

•

Carbon Bisulfide: Stauffer Chemical Co. will build at Mobile, Ala., a multimillion-dollar plant to produce carbon bisulfide. Construction work starts immediately; estimated date of completion: spring '56.

•

Ammonia: Ammonia Chemical Corp. of California has obtained from the Merced County Planning Commission a permit to build a $3.2-million anhydrous ammonia plant in the Red Top District, Merced, Calif.

•

Silvichemicals: Alaska Pine & Cellulose Co., Vancouver, British Columbia, will build a $1-million silvichemicals plant in Vancouver's Marpole District. Production is expected early next year.

•

Polyvinyl Alcohol: American Aniline & Extract Co., Inc., has purchased acreage adjacent to Air Reduction's plants at Calvert City, Ky., as a site for a polyvinyl alcohol plant. Construction work should be completed late this year.

•

Phenol, Acetone: Hercules Powder Co.'s multimillion dollar oxychemical plant at Gibbstown, N.J., is now on-stream. Products include: 26 million lbs. of phenol, 16 million lbs. of acetone—as well as α-methylstyrene, acetophenone, and hydroperoxides.

COMPANIES

Harshaw Chemical's New York branch office has completed its move to Hastings-on-Hudson, N. Y. The company's new office will be located in facilities now under construction at the plant site of the company's recently acquired subsidiary, Zinsser & Co., Inc.

•

Food Machinery and Chemical Corp.'s offer to acquire the common stock of Chiksan Co. has been accepted by more than 93% of the shareholders of Chiksan common stock. Hence the acquisition of Chiksan by Food Machinery will be consummated in accordance with terms of the exchange agreement.

•

More company incorporations in Dover, Del.:

• American Exploration and Chemical Corp., listing authorized capital stock of $100,000.

• Cuban International Sulphur Corp., listing authorized capital of $4 million.

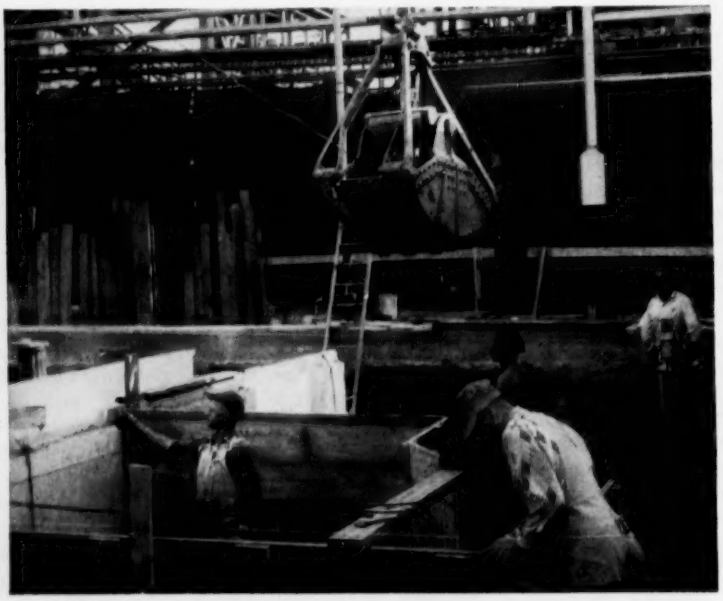
• Electro Chemical Laboratories Corp., listing authorized capital stock of $12.5 million.

•

Western Potash Corp., Ltd., Calgary, Alberta, has arranged $17.5 million in financing for the development of its Saskatchewan potash reserves. Plans call for issuance of 10 million shares of stock, which have been underwritten, and $11 million of debentures.

•

Pittsburgh Coke & Chemical Co. has acquired the "agricultural chemical program" recently terminated by Ethyl Corp. Under terms of the agreement, Pittsburgh Coke will continue all research and development projects uncompleted by Ethyl.



Doubling Up in Louisville

CONSTRUCTION WORK has already started this week on a doubling of capacity at B. F. Goodrich Chemical Co.'s rubber and latex plant at Louisville, Ky. Completion is expected early next year; cost: $2.5 million. Its new program is closely allied with the company's new $8.5-million acrylonitrile plant under construction at Calvert City.

Calvert City will supply all the acrylonitrile necessary to turn out Hycar special-purpose rubber and latex at Louisville.

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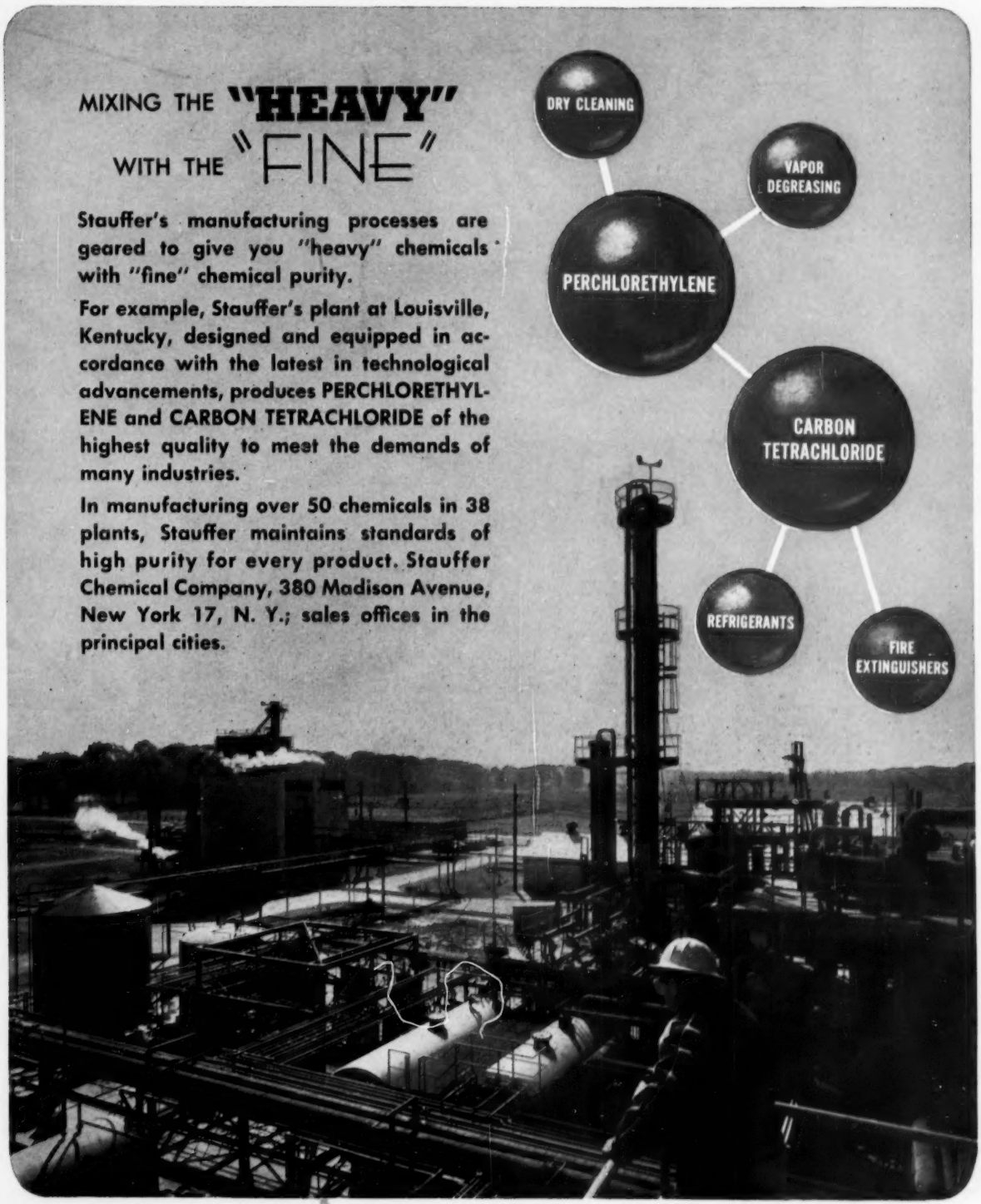

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MONSANTO
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WORLD'S LARGEST PRODUCER OF ELEMENTAL PHOSPHORUS

COLLEFERRO: Bombrini Parodi Delfino's chemical center in the Roman Campagna rises from once desolate ruins.

Score One for Management

U.S. chemical industrialists with big stakes abroad should detect (if they haven't done so already) a healthier politico-economic climate for business in Italy today. Pinpointing the reason: Italian labor is retreating in earnest from its recent, nearly disastrous flirtation with Communism.

Take, for example, the case of central Italy's biggest chemical manufacturer,* Bombrini Parodi Delfino Co. (BPD) at Colleferro, three miles from Rome. Plagued for years by Communist infiltration in their labor ranks, company officials in 1946-47 saw 80% of their 5,000 workers vote for Red shop committeemen. Yet by 1949-50 the total had fallen to 60%, hit a new low of 23% in a recent election last year. Moving right along with the drop, but in the opposite direction: worker productivity, which has been hiked a staggering 40% over five years ago.

Discussing the question of how the change came about, BPD directors admit that more sympathetic labor backing and a healthier company economic outlook turned basically on two critical points: (1) steady employment, underwritten to a large degree by NATO orders (BPD has had some $40 million so far), and (2) enlightened worker welfare measures instituted by the company. In a country like Italy, experience shows that the second point can't be discounted lightly.

Lesson Well Learned: Realizing this, Bombrini management is taking a healthy lead to insure maximum future well-being for its employees. Company housing near the plant provides quarters on a far-improved scale than existed prewar. Once-rural Colleferro is now a modern town replete with public services, churches, hospitals, schools, stores—all BPD built.

Today over 70% of the concern's 5,000 employees lives in apartments, houses, and hotels, company-constructed and -operated. Current rates: about 60% below rents in Rome. Company restaurants and canteens save workers 40%, and BPD-run stores cut 25-30% off normal retail prices.

Housing levies charged by the Italian chemical maker roughly average $10/month for small 3-4 room apartments; $30/month for more comfortable 5-6 room lodgings. Best meals served in company restaurants stand workers no more than 90 cents (without wine). Total yearly cost to Bombrini for housing facilities: about $200,000.

The Extras Count: Like anywhere else in the world, however, homes, food, and work aren't necessarily enough to insure full worker backing of management. And Bombrini directors know it. To insure full leisure benefits, side by side with living facilities, BPD operates its own recreation halls, cinemas, sports grounds, and gymnasiums. Club rooms, libraries, card rooms, lecture halls, and complete sports facilities provide BPD employees and their families (at trifling cost) plenty of room for associative life.

Up to now the big Italian chemical

* Now making heavy chemicals, organic intermediates, fertilizer, insecticides and explosives.

FLOWERY FLOAT: On a holiday, BPD workers ride company display.

OFF DUTY: Cards in company

OLD SPORT: "Bowls" on BPD fields.

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In addition to its present uses, Styrene Monomer has extremely interesting research possibilities.

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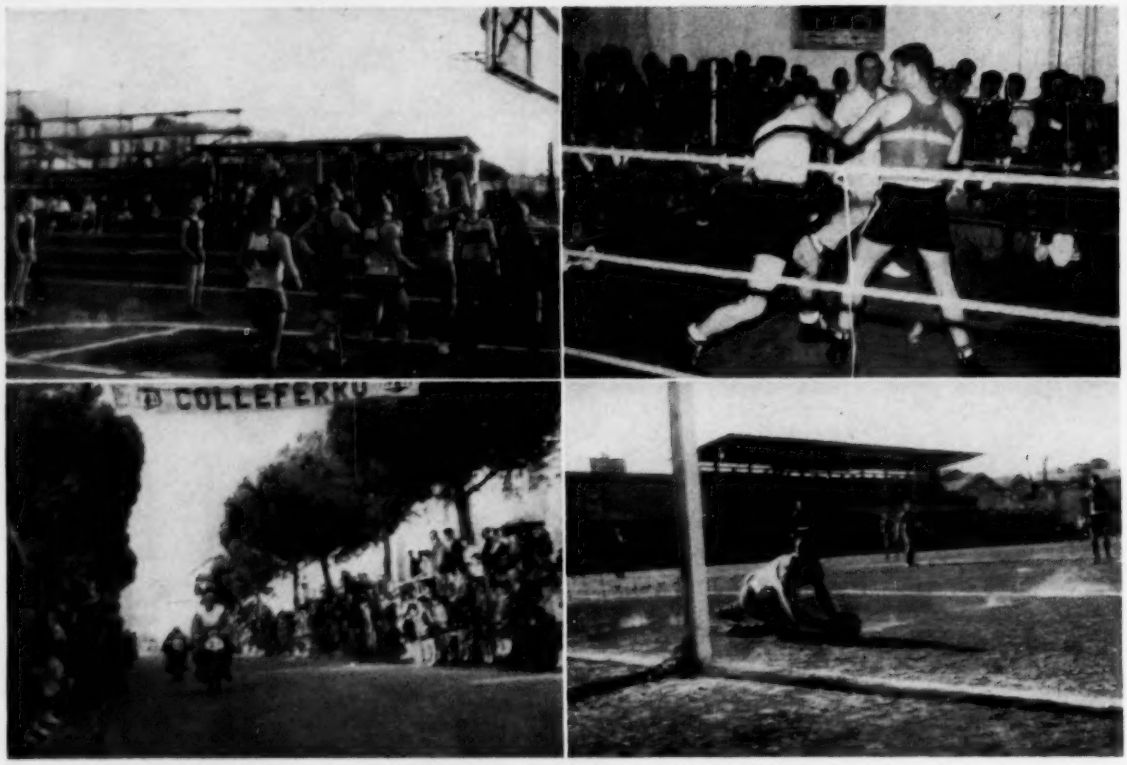

LURING CROWDS: Basketball, boxing, motorcycling, and soccer, plus myriad other spectator sports keep chemical workers' interest high. All facilities and equipment are company-provided, with slight fees for participants.

manufacturer has spent some $4 million (since the war) on all welfare outlays for employees and dependents. It has even seen fit to supply management personnel (as well as capital) for expanding and directing leisure activities. Functioning with its own director, a Special Capital Assets Office has been set up, enjoys fullest independence compatible, of course, with controls exercised by BPD's managing director.

Though Italian industrialists don't deny the still-strong influence Communists wield over hourly workers, they're equally quick to admit that welfare benefits (like Bombrini's) are prime weapons in combatting it. Indeed, under the present low wage level now existing in Italy (southern, especially) such tactics are probably the only adequate defense yet found.

It's taken FIAT (in Milan) nearly ten years to even begin making inroads against Communist influence over its well-paid, highly skilled workers. BPD feels it has won the battle in far shorter time.

Question of Understanding: Convinced, probably for the first time, that legitimate, non-Communist labor organizations can in the long run be beneficial to management, Italian industrialists today are taking another big step toward cementing labor-management relations. Rather than thwarting labor unions' growth, they're now encouraging it. Result: Italian labor for the first time is beginning to feel like part of the company team. If this attitude continues, chances are that effects will be significant, not only for Italian chemical industry, but for the country's future industrial progress as well.

Italy still has a long pull ahead befor catching up with the rest of Europe in recovery, but no one can deny it's on the right track.

OFF FOR A WEEKEND: Company buses take workers sightseeing.

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General Tire also produces . . .
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Where the Government Stockpiles Stand

	In Billions of Dollars			In Number of Goals Achieved		
	June 30, 1954	Dec. 31, 1954	% Achieved	June 30, 1954	Dec. 31, 1954	June 30, 1956 (estimate)
Goal	6.9	9.6	90-100%	38	45	54
Not yet ordered	2.1	4.1	75-89%	——	3	10
On order	0.6	0.6	50-74%	19*	10	4
On hand	4.2	4.9	under 50%	18	17	7

* Estimate is for 50-89% of goals achieved.

Coming into the Limelight

Stockpile investigations are beginning to grab a share of the political spotlight again. Reason: a number of nonintegrated consumers have been complaining that supplies aren't getting through to them anymore, and others (in the Office of Defense Mobilization) are worried over accelerated buying programs of several metals (lead and zinc) indicating lower and lower stocks now on hand.

Immediate result will probably be an all-out investigation of the over-all stockpile question sometime after Congress adjourns this summer. Leading probes: Senator Murray (D., Mont.), Chairman of the Senate Mining Subcommittee. His two main questions:

- Are the right formulas being used on long-range stockpiling?
- Are materials being stockpiled in a manner most expeditious for quick utilization and economic savings?

Veil of Secrecy: Actually, Murray's investigation, if it gets off the ground, would be the first broad look at the stockpile situation the government has taken in over a year. Committees of Congress have delved into particular phases from time to time (manganese, titanium, lead and zinc, for example), but tight restrictions have been clamped on released information to keep market price jiggling at a minimum.

Even the semiannual reports to Congress (the latest released last week) give only general information, few details. This latest report (*see table above*) has, however, an added feature—prediction of the total size of U.S. government stockpiles in 1956.

By that time, 45 of the 75 stockpiled materials should be completed, nine more materials should be within 10% of completion, and 8% more within 25% of completion. In addition to the 62 materials expected to be 70% or more complete by June 30, '56, several others (of the remaining 13) should be completed within 2-3 years.

Materials added to the critical materials stockpile—there are 75— from June 30 through Dec. 31, '54, totalled somewhat more than $600 million, bringing to $4.1 billion the materials on hand for the minimum stockpile objective. Including another $800 million on hand for the long-range stockpile objectives, the total stockpile inventories on hand through Dec. 31, '54, totalled $4.9 billion.

The December minimum stockpile objective—based on military minimum requirements—was $6.5 billion. Of this, $4.1 billion was on hand, $400 million on order, and $2 billion unordered as of Dec. 31, '54. Total stockpile objectives on that date, including the long-range program stocks, were $9.6 billion. Of these, $4.9 billion was on hand, $600 million was on order, and $4.1 billion was still unordered as of Dec. 31.

These figures are in contrast to those released in the stockpile report on June 30, '54, when total objective was $6.9 billion—$4.2 billion was on hand, $600 million on order, and $2.1 billion unordered.

Within the next 2-3 years, if everything goes as planned, ODM officials predict that the value of the stockpile will reach $7.6 billion—compared to its objective of $9.6.

At present, stockpile materials are stored in 294 locations—half of them in commercial warehouses, and a fourth more at military depots. The remaining quarter is stored in leased sites, industrial areas, oil-storage sites, or in General Services Administration depots.

All such matters are likely to come under close scrutiny, but should breeze by in style. What may prove more difficult to answer: the charge that nonintegrated consumers (specifically aluminum producers) aren't getting supplies as a result of the current stockpiling methods.

Business Benchmark?

Inland Steel Co. will expand its Indiana Harbor Works at a cost of several million dollars. On tap for special expansion consideration: steelmaking capacity—which will be increased by 200,000 tons/year; coke-making units—which will be expanded by 455,000 tons or 21% a year.

Facilities for handling and storing coal, benzol, toluol, pyridine, and ammonium sulfate will also be expanded.

The new coke batteries (Inland's seventh battery) should be completed within 24 months time; the steel capacity increase will be the company's third major expansion in consecutive years without construction of new furnaces. (Pushing the total up to 5.2 million tons/year.)

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- protective coatings
- synthetic fibers
- lubricating oil additives
- adhesives
- nylon sizing
- transparent sheeting
- soil conditioners

If you're interested in copolymers for the rapidly developing emulsion paint market—be sure to consider the outstanding properties offered by the acrylic esters.

* Acrylonitrile, styrene, butadiene, and vinyl acetate are also available in tonnage quantities from CARBIDE.

ALBERT HARRIS, OAKLAND

RITCHIE (standing), WITNESS*: For embattled additive, good words.

In 11-State Hearing, the Final Curtain

At long last, the five-year feud between the federal government and a small chemical specialties concern appears to be coming to an end. And it looks like peace with honor for California's Jess Ritchie and his battery additive AD-X2, while the governmental agencies now seem to be chiefly concerned with face-saving.

The hearing that started last autumn in Washington and has continued off and on in 11 states across the country now is winding up in Oakland, Calif. —right where the dispute started. Oakland is Ritchie's home base, and it was at nearby San Francisco that a local battery manufacturer set off hostilities by complaining about how AD-X2 was affecting business.

Since then, AD-X2 has been blasted by the Assn. of American Battery Manufacturers, National Better Business Bureau, the U.S. Bureau of Standards, the Post Office Dept. and the Federal Trade Commission. The hearing expected to be concluded this week in Oakland's Tribune Tower is on FTC's charges that AD-X2 doesn't live up to its advertising claims.

Decision Next Month: Hearing Examiner William Pack is expected to make his decision by late next month, and his decision can be appealed first to the commission and then to the U.S. Court of Appeals. But observers are predicting that—on the basis of the testimony going into the hearing record—the federal agencies will have to let Ritchie walk off with general clearance for his product claims.

In presenting its side of the case, FTC produced nine witnesses who had used a total of 43 packages of AD-X2; but their criticism of the product was weakened by the fact that either they hadn't kept records on battery performance or else Ritchie was able to argue that they hadn't used the additive according to instructions. On the other hand, Ritchie has called in 40 witnesses, all of whom have praised AD-X2 as doing all that's claimed for it. For example, a battery mechanic at a Naval supply center testified that AD-X2 had more than doubled the useful life of lead-acid batteries, and that "I'd still be using it if the government would let me."

One possibility: that Ritchie might accept a ruling that he should drop one or two minor claims—an order that would save face for the Bureau of Standards, which has called the product "worthless."

* Gordon Jaeger, master mechanic of Dinwiddie Construction Co., Oakland.

Pace Quickens

Driving back from its postwar position of seemingly hopeless destruction, the French chemical industry today is riding along on a wave of profitable activity. Through the past year, output rose to a record index of 180 (compared to 100 in 1938 and 154 in 1953), stocks have soared past 220 (using 1949 as a base year).

Expansion in all sectors of the industry has been remarkably parallel. For example, between '48 and the end of '53, eight sulfuric acid plants were built (or rebuilt) in France; today, total production runs well over 1.3 million tons/year. Production of chlorine rose from 66,500 tons in '48 to 138,000 tons in '54.

There's been a similar rapid development in the manufacture of new detergents for home and industrial uses. And in the plastics field, French production has climbed from 10,000 tons in '38 to 53,000 tons/year in '53.

According to the Ministry of Industry and Commerce, greatest strides this year will be registered in the following fields: methane and acetylene derivatives, hydrocarbon chemistry (particularly acetone and phenol products), and petrochemicals.

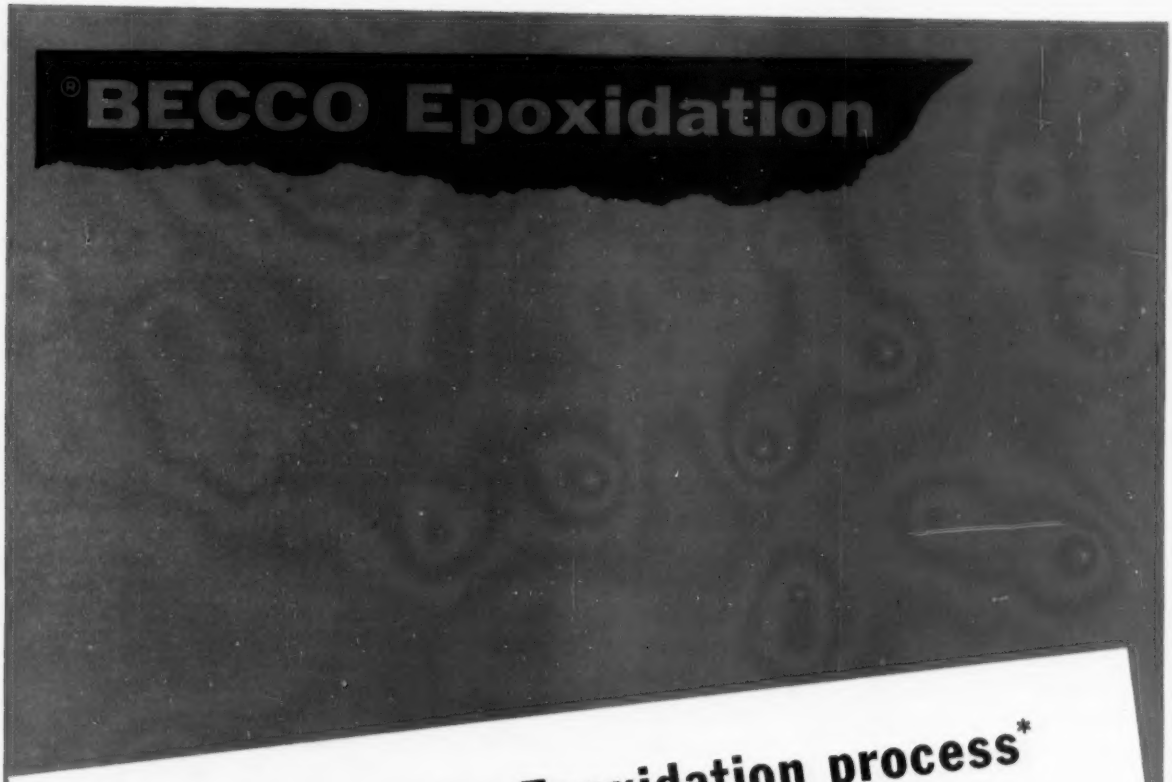
Difference of Opinion

The Hoover Commission last week recommended that the government get out of commercial activities, but the House of Representatives, by a 202-184 tally, favors keeping the Defense Dept. in business.

The Hoover group recommended sale or lease of: Navy shipyards where paint is still being made; the 11 chemical facilities owned by the Defense Dept., whether in operation or in stand-by; and the Interior Dept. helium facilities.

Too, the group advocates discontinuance of all chemical research by TVA, proposes that fertilizer research facilities be transferred to the Agriculture Dept. and that TVA fertilizer sales include all costs . . . including loss of taxes.

But the House disagrees. Says Democrat Mendel Rivers (S.C.), in advocating the provision: "We do not want to destroy [the Navy Yards], and we are not going to ask you to do it under the guise of getting the government out of business . . ."



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MORE MACHINERY/MAN, MORE OUTPUT/MAN

(Production and productivity in manufacture of paints, enamels and allied products in U.S.—data from U.S. Bureau of the Census)

Year	Number of production Workers	Value added by manufacturing	Productivity, as value added per worker
1899	9,697	$24,823,000	$2,570
1904	11,633	31,031,000	2,670
1909	14,240	45,873,000	3,220
1914	16,083	57,158,000	3,560
1919	21,507	123,235,000	5,740
1923	22,818	155,179,000	6,790
1927	28,061	211,286,000	7,530
1931	22,521	156,989,000	6,960
1935	27,686	185,017,000	6,690
1939	27,660	225,818,000	8,150
1947	45,822	573,237,000	12,500
1949*	31,247	433,987,000	13,850
1950*	32,298	489,968,000	15,150
1951*	34,640	558,206,000	16,100
1952*	33,042	584,413,000	17,650

*Figures for these years are for plants classed as "paint, enamel and varnish producing" only.

Big 'X' in Profit Equation

That mechanization and automatic controls are the biggest variable factor in chemical management's plant-profit equation is suggested by a recent productivity survey among paint manufacturers.

Out last week, the study—made by the U.S. Bureau of Labor Statistics—shows that among five competing plants, there was a more-than-54% spread in productivity rates and a more-than-304% spread in relative labor costs. These differences were accompanied by roughly proportional differences in up-to-dateness of equipment.

This principle of modernizing your tools for more economic production—often discussed in general terms but seldom set out in comparative figures on a plant-by-plant basis—is further illustrated by Census Bureau data on U.S. paint makers as a whole (*see table, above*). Disregarding changes in dollar value,* those figures show that this branch of the industry has invested in plants and machinery that have permitted average annual dollar-value output per worker to increase nearly sevenfold in 50 years.

Newest Plant Most Efficient: A sixth plant included in the survey was far more efficient than any of the others in terms of productivity—it required only 27.46 man-hours per 1,000 gallons of production. However, this plant was a varnish-only unit within a multiple-product works. This unit—turning out three principal kinds of varnishes—was built only a few years ago, and still more modern equipment has been added since then.

At the other five plants, where figures are based on production of paints and enamels (not varnish), yearly output ranges from about 360,000 up to 5.6 million gallons. The one that stacks up as most efficient turns out some 720,000 gallons/year, requires 73.77 man-hours per 1,000 gallons. Its labor cost is only 6.8% of total production costs. This plant was designed and built in 1949.

By contrast, a slightly larger plant—producing 800,000 gallons/year—appears to be least efficient. It uses 114.18 man-hours per 1,000 gallons, and wages accounted for 13.7% of production costs. BLS says this plant uses "relatively modern equipment," but qualifies this by observing that "no major changes have been made in the equipment since 1947."

Largest and Oldest: The largest plant in the survey—batching some 470,000 gallons/month—is also the oldest; in fact, its three buildings for manufacturing operations are about 80 years old. A fourth building was added in 1948 for warehousing and shipping. This plant requires 112.21 man-hours per 1,000 gallons, and its labor cost has been 16.2% of production costs.

"No outstanding advances have been made in recent years in improving the efficiency of the plant," BLS notes. "During the past several years, economies of perhaps as much as 5% of the labor costs have been achieved, but these have not been concentrated in any one department."

Naturally, the type of products makes considerable difference in productivity. The two plants with relatively low productivity ranking both turn out a variety of household paints, enamels, varnishes and miscellaneous items; the newest and most efficient plant is one that produces house paints, including latex-based paints and enamels, and industrial paints. It doesn't go into varnish production at all.

Output Doubled: Second most efficient of the five paint and enamel plants was also the second largest, producing about 2.5 million gallons of house paints and enamels. It required 91.68 man-hours per 1,000 gallons, and wages were 11.2% of production costs. "To increase productivity," BLS reports, "stone grinding mills were replaced with large-capacity ball mills. This doubled output with no increase in man-hours."

The fifth and smallest plant clocked an even 100 man-hours per 1,000 gallons of flat-white wall paint, and had the highest relative labor charge, 30% of production costs.

For newly equipped plant C, the saving on direct labor relative to productivity in plant B is equivalent to more than 7¢/gallon. This is the kind of competitive pressure that is spurring chemical management on capital expenditures.

* While the average wholesale price of paint products has more than doubled over the 56-year period, this is partly compensated for in productivity rates by the fact that average time worked per year has been slashed by the eight-hour day and by increased time off for vacations and holidays.

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- Plastisols
- Polyesters
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- Rubber cements and coatings
- Shade cloth
- Silk screen and stencil inks
- Stains
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- Waterproofing compounds
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- EXPLOSION RESISTANT
- MINIMUM GROUND SPACE
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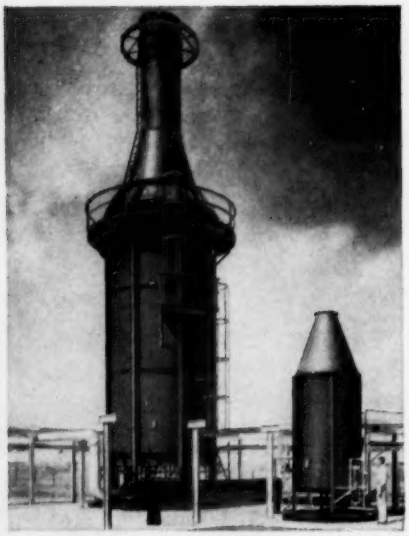
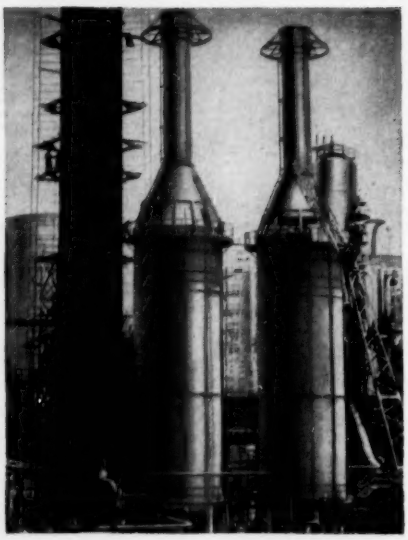
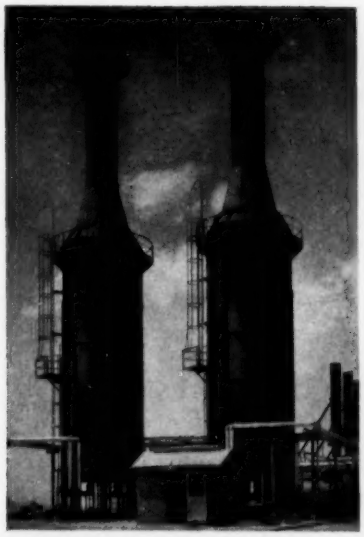
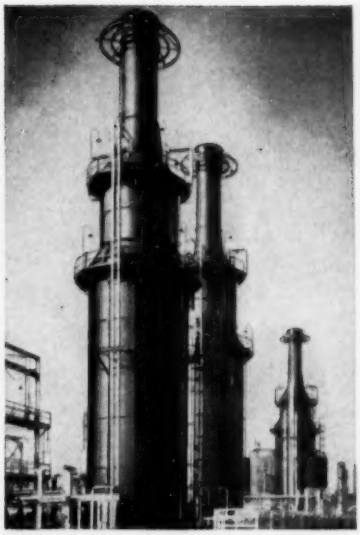
- ZERO AIR LEAKAGE
- LOW PRESSURE DROP
- LOW MAINTENANCE

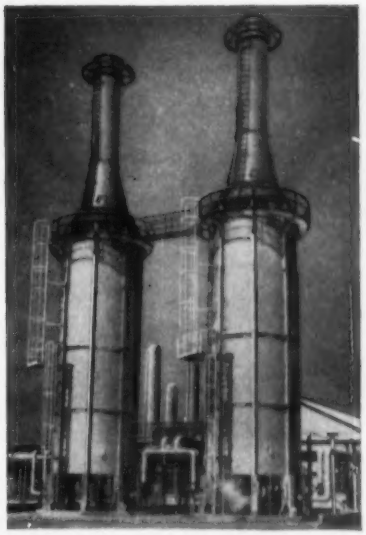
In every case where these 11 all-important design characteristics were employed to compare one type of furnace design with another, PETROCHEM-ISOFLOW FURNACES were proved most efficient by any comparison.

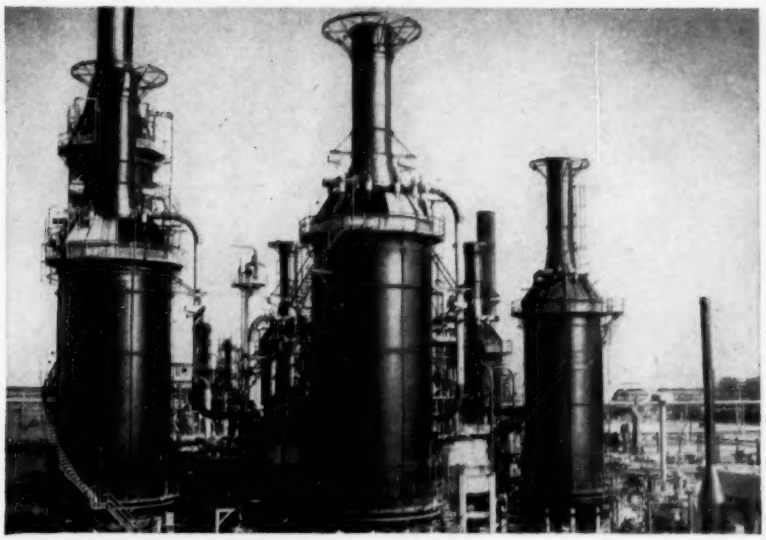


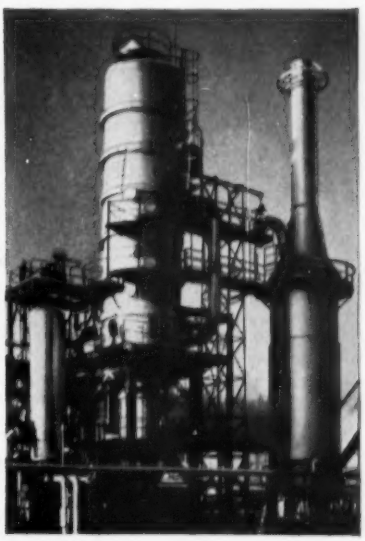


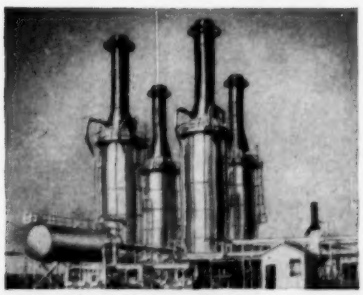


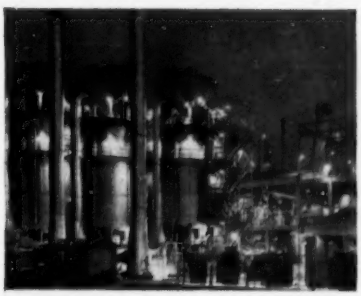


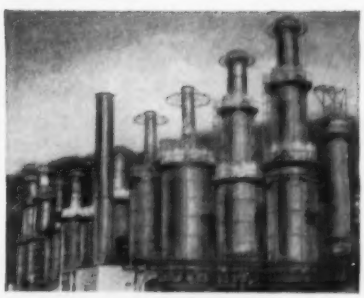












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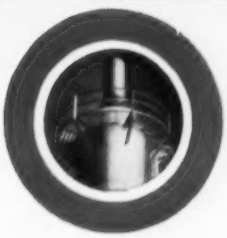
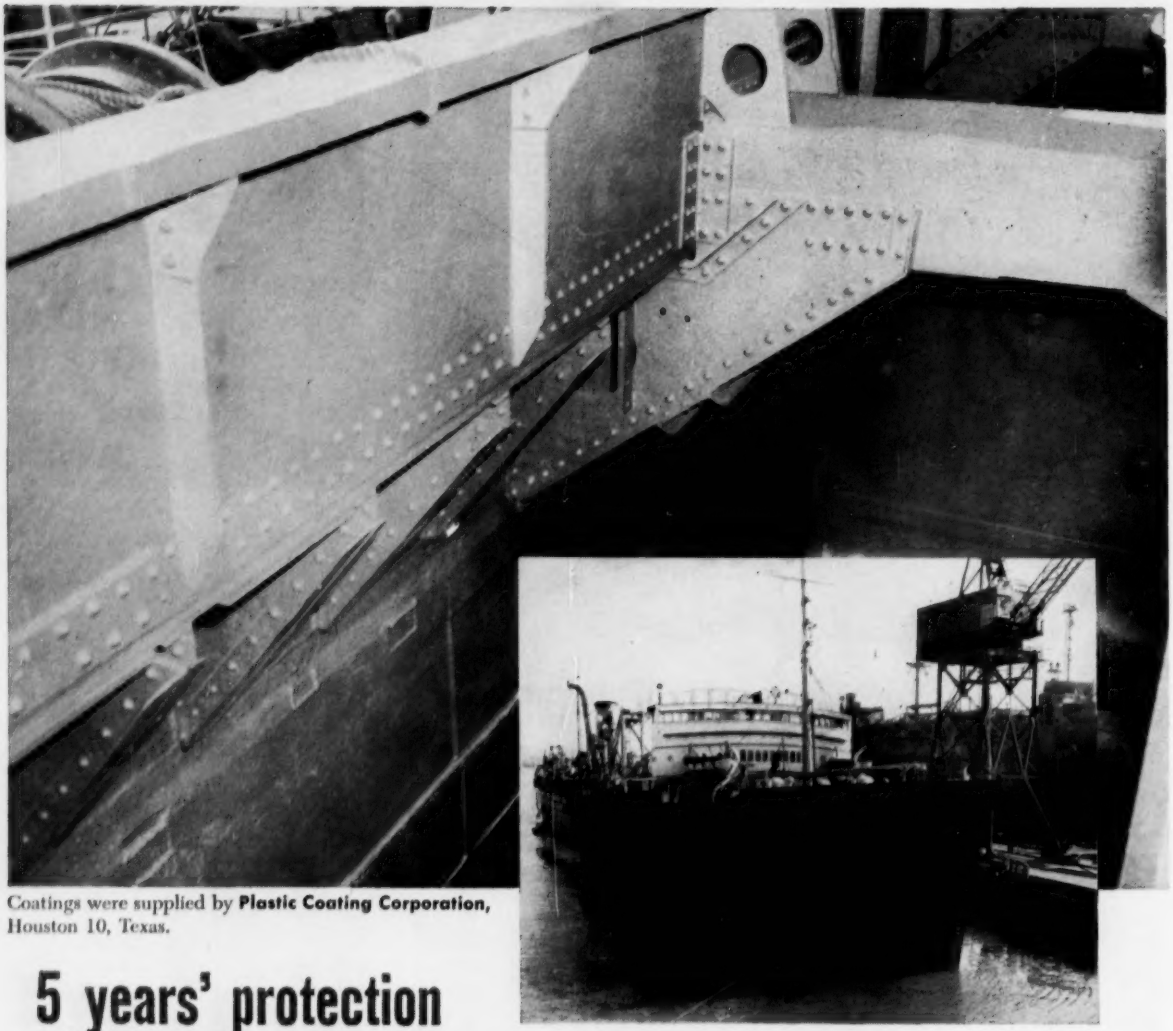


MORE PROOF it pays to specify coatings formulated with BAKELITE Resins



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Why did the U. S. Army Corps of Engineers select this particular coating? Well, for ten years before 1949, all other coatings used were destroyed within 6 months' service. They couldn't take the severe corrosive action of salt air and water, hydrogen sulphide fumes rising from dredged material, and the rough abrasive action of sand and silt emptied into and out of the hoppers.

In 1949, a four-coat system based on BAKELITE Vinyl Resins was applied. It completely arrested the eating-away of, for example, longitudinal steel hopper girders which, in the ten prior years, had lost more than 30% of their thickness from corrosion and abrasion.

Whether for marine use, for industrial buildings, pipe, equipment, for metal or masonry, you can always expect longer years of service, greater toughness and chemical resistance when you specify coatings based on BAKELITE Resins. For names of suppliers and a copy of our free booklet "BAKELITE Resin Coatings for the Chemical Industry," write Dept. HS-34.

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CURIOSITY-PROVOKER: Scale-size model of Texas City production unit.

No Sales Talk Like Experience

For several years, with technical manpower supplies tightening, chemical management has been actively scurrying about looking for new ways to entice recruits into the fold.

Reason: expansion projects (or contemplated expansion plans) depend in great measure upon a continuing flow of young chemists and engineers into the company. And the number of graduates turned out each year simply hasn't been ample to go around.

Result: companies, from one end of the country to the other, have been striving to find means to sell the merits of working for *them*. Particularly successful in this quest has been the Texas City plant of Carbide and Carbon Chemicals Co.

Its plan is basically simple: sell the graduate on men instead of materials. Give him down-to-earth examples—in pictorial exhibits—of how other recent graduates have fared in a given number of years in the company.

Student Cooperation Requested: If the company is able to get active cooperation from students at the college, so much the better. Those engaged in planning details have an opportunity to come in close contact with company representatives; personnel officials, in turn, benefit from student suggestions.

Such was the case at a recent A.I.Ch.E. open house meeting at the University of Oklahoma. Sponsored by the engineering students chapter of A.I.Ch.E., the open house assembly included over a hundred exhibits, mostly built by the students, illustrating thirteen different phases of engineering.

Focal point of the Carbide exhibit was a scale model of a fine-chemicals unit recently put on the production line at Texas City. But the model was aimed only at whetting the student engineer's technical curiosity.

To show what the company offered him as a person, Carbide's display featured 16x20-in. portraits of Oklahoma University graduates now working at Texas City. Under each picture was vital information about the man, including his present corporate position. Emphasis was placed on recent Oklahoma alumni—those who graduated and started work for Carbide within the past three or four years.

In addition, visitors to the show were encouraged to pick up brochures depicting the life history of a "typical" OU man with the firm. The picture story carries the man from his first job in the Process Development Department to department head of an actual production unit.

Immediate reaction among prospective job candidates: an A+ job of selling by the Carbide Texas Division.

CPW Christening

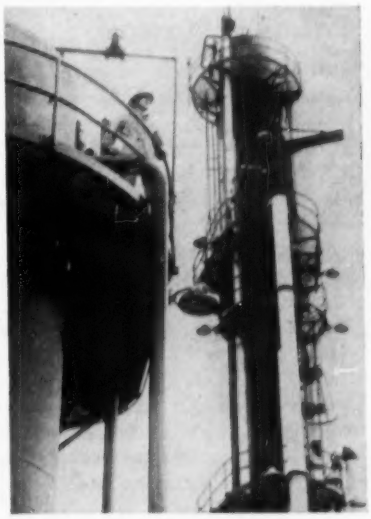
Timed to coincide with the opening of Chemical Progress Week last week, Spencer Chemical Co. dedicated its recently completed polyethylene plant at Orange, Tex.

Dedicated 21 months after groundbreaking, the plant has a rated capacity of 45 million lbs./year of polyethylene resin. After a highly successful test run, start-up took place on Feb. 22, at which time the plant was placed on automatic control within 15 minutes after initial production.

This brings annual output of polyethylene in the U.S. to approximately 300 million lbs.

Also scheduled to bring plants onstream soon:

- Bakelite Division, Union Carbide (biggest producer of conventional polyethylene), is building a fourth plant (capacity: 60 million lbs.) at Torrance, Calif.
- Koppers Co. is building facilities at Kobuta, Pa.
- Phillips Chemical is planning a 100 million lb./year plant, no date of completion scheduled.



OFFICIALLY OPERATING: Spencer's distillation tower at Orange, Tex.

AFL'S GARFIELD: After triumph at convention, a sudden exit.

Less Militant Union

More conservative, less militant, is the outlook for the International Chemical Workers Union (AFL) following the recent death of Sidney Garfield, an ICWU vice-president for more than seven years and one of the union's more aggressive leaders.

Garfield—who died of a heart attack at Jeffersonville, Ind., last fortnight, at the age of 42—had led the drive at last summer's convention to oust H. A. Bradley as ICWU president. Temporarily in charge of Garfield's Chicago district: William McGrogan, veteran organizer.

Palms to Hawaii

Two separate items of note bring Hawaii into the chemical news this week.

Either—if it develops as Hawaiian industrialists envision—could be a big spur to U.S. industries interested in overseas expansion projects.

- Tax exemptions for firms manufacturing pulp and paper from sugar bagasse have been passed by the Hawaiian territorial legislature and signed into law by Gov. Samuel W. King.

This means that firms now entering the field will receive exemption from real property and excise taxes for five years from the time actual production starts.

- Hawaiian Sugar Research representatives are now predicting that a new family of detergents based on sugar will be out of research (*CW, March 26, p. 55*) and ready for production consideration by fall.

Some 130 companies are said to be actively assessing the new sucrose esters, with a substantial number on the verge of negotiating process licenses.

Outlook: a big boost in Hawaiian chemical activity.

Shelved till '56

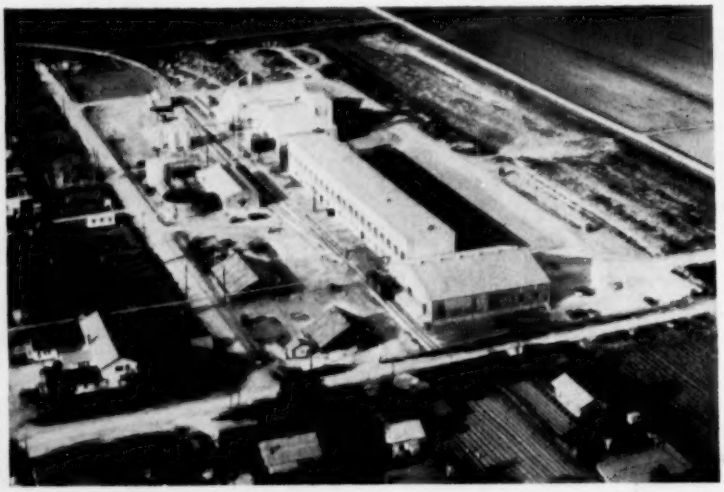
More and more, it appears that this won't be the year of decision for the guaranteed annual wage.

Just as the CIO's Oil, Chemical & Atomic Workers Union has been probing at this issue in some sectors of the chemical industry (*CW, May 21, p. 30*), so other CIO unions have been raising the issue in their industries—mostly for the purpose of exploratory discussions.

Last week, the CIO's United Glass & Ceramic Workers dropped their GAW demand for 1955 when two of the larger flat-glass producers agreed to cooperate with the union in making a year's study of employment stability in the industry. Also in the agreement: a general wage increase of 8¢/hour, increased insurance benefits, and adjustments of 8¢ and 6¢/hour for maintenance and nonbonus workers, respectively.

The United Steelworkers (CIO) will mention GAW in their upcoming negotiations with the big steel companies, but their reopener clause limits actual bargaining this year to wages alone. However, the steelworkers are expected to notify the companies to be ready to bargain on GAW next year.

And there's a chance that Walter Reuther's United Auto Workers—foremost champion of GAW—will shelve this demand until 1956, rather than plunge into a strike. Indications are that General Motors and Ford will offer wage rises now but want more time to study GAW.



Sugar Bowl Expansion

VALENTINE PULP & PAPER CO. is increasing production at its paper-from-bagasse plant on storied Bayou Lafourche. Estimated increase: from 50 to 75 tons/day.

Jointly owned by Brown & Root, Inc. (Houston) and the Valite Corp. (New Orleans), the plant is reported to be the only major facility in the U.S. using whole sugar cane bagasse for paper manufacture.

It's estimated that Louisiana produces 800,000 tons of dry bagasse annually, less than 40% of which is now used, so that Valentine's increased output of paper should put no strain on raw material supplies. Water, too—a prime requisite in the process—is readily available from nearby bayous.

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ODORLESS WALL PAINT with EPON® RESIN

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—in brief

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● **Anti-oxidants** from higher fatty alcohol esters have the advantage of complete solubility in fats. For use in products where freedom from contaminants is urgent, chem-men rely on CACHALOT brand cetyl, oleyl, and stearyl alcohols, produced by the newest techniques of vacuum distillation and high-pressure hydrogenation.

● **Superfatting** with cetyl alcohol lessens the drying effects of today's high-powered detergents and soaps. A bonus is the pure white color of odorless CACHALOT cetyl alcohol in NF and technical grades, a result of over twenty-five years of original fatty alcohol research.

● **Wool-dacron mixtures** show new luster and finer loft when finished with textile chemicals compounded with fatty alcohols. As intermediates or additives, CACHALOT cetyl or stearyl alcohols offer freedom from shelf storage problems. They cannot turn rancid.

● **Non-foaming adhesives** are compounded with cetyl or stearyl alcohol without reducing either adhesion or viscosity. CACHALOT alcohols act as their own emulsifiers in these formulations, just one of many specialized uses for the largest line of fatty alcohols available in tonnage lots of controlled uniformity.

● **Survey the field:** *write for facts on fatty alcohols. Send the coupon on your letterhead to M. Michel and Company, Inc., 90 Broad Street, New York 4, N. Y., thirty years a basic supplier to chemical manufacturers.*

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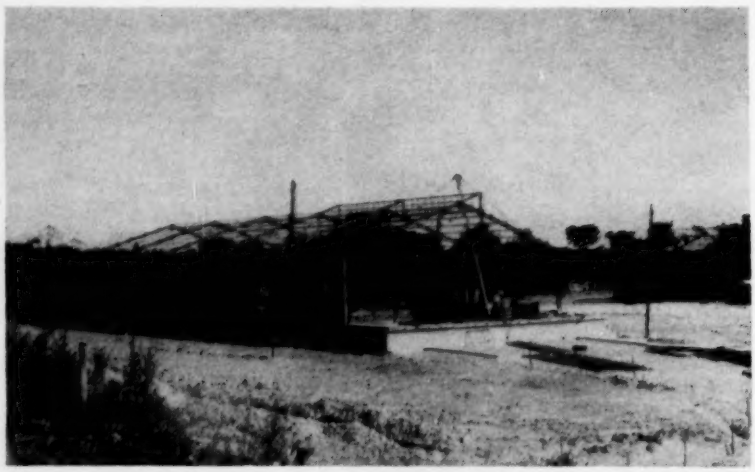
name .....

position .....

company .....

address .....



SULFUR UNITS: Have encouraged Mexican officials to seek help in other expansion plans.

FOREIGN . . . . . .

Insecticides/Mexico: Encouraged by the success of its recent fourfold sulfur expansion program, Mexican government officials (through Industria Nacional Quimico Farmaceutica, S.A.) are now accepting bids for construction of an insecticide plant in northern Mexico. Planned capacity: 2,000 tons/year of benzene-hexachloride and DDT, plus 40 tons/day of liquid chlorine. Chief consumers: Mexico's cotton growers.

•

West German–Greek Cooperation: The West German Economics Ministry says that all outstanding problems hindering West German participation in the building up of Greek industry have now been solved. Result: Greece will be able to take advantage of the 200 million marks ($47.6 million) credit offered by West Germany about two years ago.

Expected to be one of the first projects to get started: establishment (by Krupps of Essen) of brown coal works of Ptolemais, and a nickel plant at Larymna.

•

Disappointment/Japan: Japanese economic circles are openly disappointed over the $84-million trade agreement just concluded between Japan and Communist China. Reason: there will be little change (they claim) in the present unfavorable trade balance with China due to COCOM embargoes.

Ammonium sulfate producers, in particular, are chagrined over proceedings. Why? Because the government, while clinging to control of fertilizers exported from Japan, refused to underwrite the trade agreement. And without a government o.k., they're virtually handcuffed in carrying through trade pacts.

•

Japanese-Italian Pact: An agreement was signed in Milan last week between representatives of Shin Nippon Fertilizer KK and Montecatini, for technical aid (to be supplied by the Italian firm) in construction of an ammonia-from-crude-oil plant in Japan. The contract will last for 15 years.

Montecatini also recently signed a technical aid contract with Nissan Chemical for the production of urea.

•

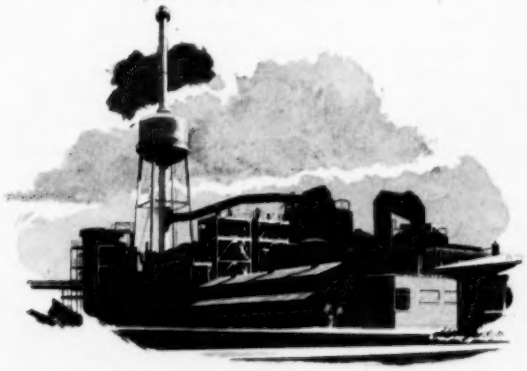
West German-Argentine Venture: A joint West German-Argentine venture has just been launched to form a company to produce phenol in Argentina. Farbenfabriken Bayer of Leverkusen will supply 35% (or $375,000) of the capital and will give technical advice on the project. Compania Quimica SA will supply the remaining 65% of the capital, will handle operating duties.

Site: San Nicolas; capacity: 1,800 tons/year of phenol (and derivatives); estimated date of completion: October, '57.

•

Penicillin/Hungary: Construction on a second penicillin plant in Hungary is currently under way. Located in the Moldau (Moldavia) region, the plant will use Soviet-produced equipment. Production rate: unannounced.

Hold on there!... there's a better way!



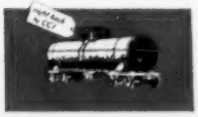
YOU CAN NOW DISPOSE OF YOUR SLUDGE SULPHURIC ACID BY SHIPPING IT BACK TO CONSOLIDATED FOR REGENERATION

Two unique sludge acid regeneration units at Houston and Baytown, Texas, were recently put on stream by Consolidated's Southern Division.

The new facilities will convert into new white sulphuric acid any grade of sludge—providing only that it can be pumped from the tank car or barge.

This new Consolidated service relieves petrochemical plant managers of the expense and bother of disposing of sludge by other means. Furthermore, it completely eliminates the danger of air and stream pollution.

Talk to the Consolidated man about your sludge acid problems. He can help you.



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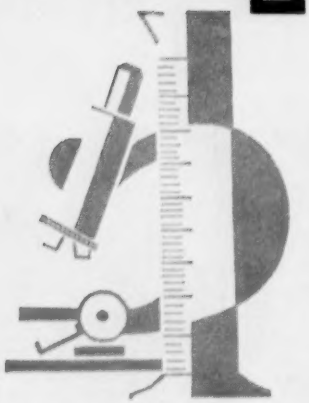

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LEGAL

Twin Suits on Sulfur: Three companies in two nations are involved in a pair of lawsuits over sulfur securities at Houston, Tex. First, two Mexican investment companies—Compania de Inversiones Generales and Inversiones de Latino America—brought suit in state district court asking an injunction to keep Houston financier M. A. S. Makris from transferring any stock of the Texas International Sulfur Co. that he formed. They assert that he "fraudulently" gained possession of TIS stock.

Last week, Makris retaliated by filing a suit of his own against the administrators of the two Mexican firms and their attorney. He's asking $700,000 damages, contending that the suits against him are a maneuver to gain control of TIS.

•

Homes for Sale: A paint company at Baltimore may be hailed into court to face the demand by neighboring property owners that it either stop releasing objectionable fumes from its plant at nearby St. Helena or else buy their homes so they can move away. Residents of the suburban community say that previous court action, pleas to the city's board of estimate, and technical studies have failed to keep fumes, dust and noise from making life in their neighborhood "unbearable." Object of their complaints: Glidden's plant, which last year was fined $300 in housing court and given until last October to remedy the situation.

•

Patents 'Disregarded': An official of Chas. Pfizer & Co.—which is fighting in two courts and in the Patent Office to protect its four-month-old patent on tetracycline—warns that "a tendency in the past few years to disregard patents in the pharmaceutical field" may seriously threaten research in the development of new drugs. Allan Greene, Pfizer's director of commercial development, told the fourth annual Rutgers University Pharmaceutical Conference that since the economic life of some drugs is very short, litigation may not stop infringement before such drugs become obsolete. Lacking such protection, he went on, a pharmaceutical company might well be forced to question whether it should continue to make extensive expenditures for research.

WIDE WORLD

BALTIMORE'S BENHOFF: At Esso plants, a stand against the CIO.

LABOR

Banding Together: When two C.O unions merged last March to form the Oil, Chemical & Atomic Workers Union, one of its primary targets was organization of the employees of Esso and Du Pont. Now there's a countering move on the part of some of the small, independent unions that now represent those employees.

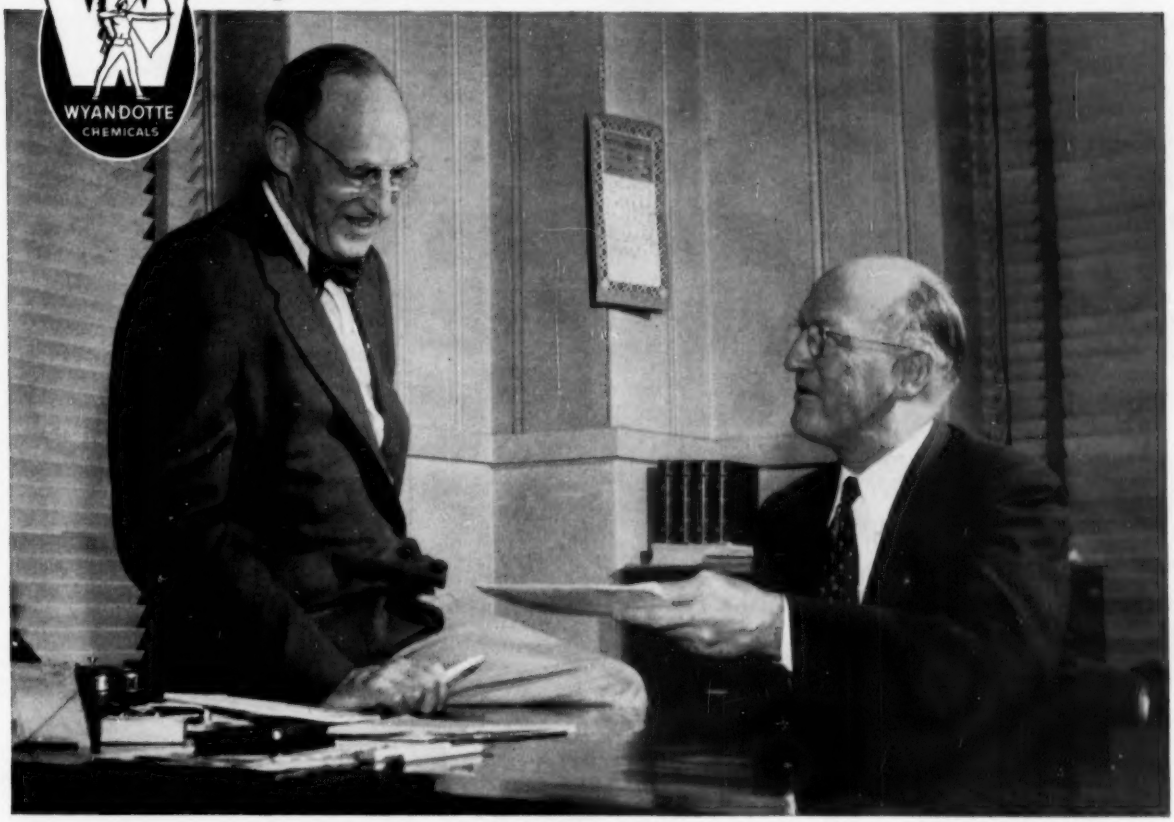
Three non-affiliated unions representing about 4,000 Esso employees are banding together in an effort to withstand CIO organizing drives. They've formed a new group to be known as Esso International Union, and chosen as their first president Baltimore's J. Henry Benhoff, formerly of the Independent Petroleum Union at Esso's Baltimore refinery. Benhoff says other Esso independent unions are considering joining the new alliance, and that its aim will be ultimately to represent all of the company's 30,000 employees.

•

Higher Wage Boosts: Pay rises in the neighborhood of 10¢/hour or more are now in season in the chemical process industries. Recent examples:

• After getting new contracts through concurrent bargaining at its three Eastern and Midwestern plants (*CW, April 9, p. 18*), Colgate-Palmolive now has nailed down a new pact covering employees at its plant in Berkeley, Calif. Base wage rates go up by increments ranging from 7½¢ to 12¢/hour; shift differentials are up

Dependable Source for Chemical Raw Materials



Eugene T. Eldredge (left), treasurer, Hilex Co., and President Asa A. Eldredge agree that it takes quality ingredients — like Wyandotte Caustic — to make a quality bleach.

"Quality chemical ingredients helped us build volume sales"

— Asa A. Eldredge, president, Hilex Co., St. Paul, Minn.

"Our Hilex Household Bleach is known to millions as strictly a high-quality product . . . and that takes the best of ingredients," says Asa A. Eldredge, president, Hilex Co., St. Paul, Minn.

"We maintain high standards in everything we buy. We insist on Caustic that is consistently very low in copper and iron content. This is a fundamental with us. We test every tank car of Caustic to see that it meets our stringent requirements.

"We have been buying Wyandotte Caustic for more than 10 years. We have found that Wyandotte products not only meet our rigid specifications for quality, but that Wyandotte gives us excellent service as well.

"Personally, we feel that when we buy this way, and know the quality of our ingredients, our own selling job becomes much easier. The Hilex Company's growth and sales record are proof of this."

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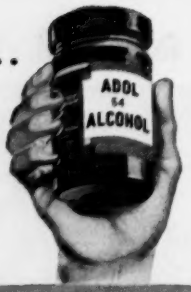
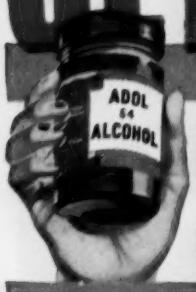


CETYL



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ADOL 64, stearyl alcohol of exceptional quality. Can be supplied in U. S. P. quality if desired.

ADOL 33, light colored liquid fatty alcohol, a superior low-cloud product for applications where low cold test is important.

ADOL 65, a commercial grade of mixed cetyl and stearyl alcohol is also available for industrial applications.

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B & I. . . . . .

by 2¢ to 10¢ and 15¢/hour; and there's a wage reopening option for next April 1.

• A 12¢/hour wage increase is coming—in two installments—to some 80 employees of Carlova, Inc., cosmetics producer at Binghamton, N.Y. These employees—represented by the International Chemical Workers Union (AFL)—are to get a 7¢ boost retroactive to May 2 and another 5¢ next year.

• Highest jump of the week: the 16¢ across-the-board increase that was included in terms for settlement of the five-week strike that the Oil, Chemical & Atomic Workers (CIO) had waged against the Lucidol Division of Wallace & Tiernan at Buffalo, N.Y. However, only about 84 production workers are in the bargaining unit.

KEY CHANGES. . .

Samuel Lenher, to vice-president, director, executive committee, Du Pont Co. (Wilmington, Del.).

D. S. Parham, to general superintendent, fertilizer production, American Agricultural Chemical Co. (New York).

Lester Dean and **Joseph Bloom,** to directors, Lithium Corp. of America, Inc. (Minneapolis).

Frank Wedge, to chemical products manager, Ansul Chemical Co. (Marinette, Wis.).

George Ham, to research director, J. T. Baker Chemical Co. (Phillipsburg, N.J.).

Robert D. Scott, to vice-president, manufacturing, B. F. Goodrich Chemical Co. (Cleveland).

J. William Stuart, to vice-president, personnel, Chas. Pfizer & Co., Inc. (New York).

William J. Roberts, to research director, Pennsylvania Industrial Chemical Corp. (Clairton, Pa.).

Melvin Hochberg, to director, research and production, vitamin division, Nopco Chemical Co. (Harrison, N.J.).

A. D. Miller, to general manager, and **C. A. Hill,** to production manager, Synthetic Rubber and Latex Division, Firestone Tire & Rubber Co. (Akron, O.).

Arthur L. Mullaly, to vice-president, Carlisle Chemical Works, Inc. (Reading, O.).

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The new Baird Associates Double Beam Infrared Spectrophotometer meets industry's requirements for a new and superior analytical instrument. Inexpensive to maintain and requiring a minimum of attention during actual operation, its advanced design incorporates many improvements that result in research and control economies. The instrument is extremely fast and accurate, easy to operate and adaptable for use with solids, liquids or gases.

In addition, the new IR Spec's advanced engineering now provides slit programming for greater reproducibility, a continuously variable speed drive, a switch to select Baird Associates or American Petroleum Institute chart scales and a choice of parameters that provide more complete analysis. It is designed to easily permit the installation of new accessories as developed, and is used to great advantage in most of the organic chemistry industries.

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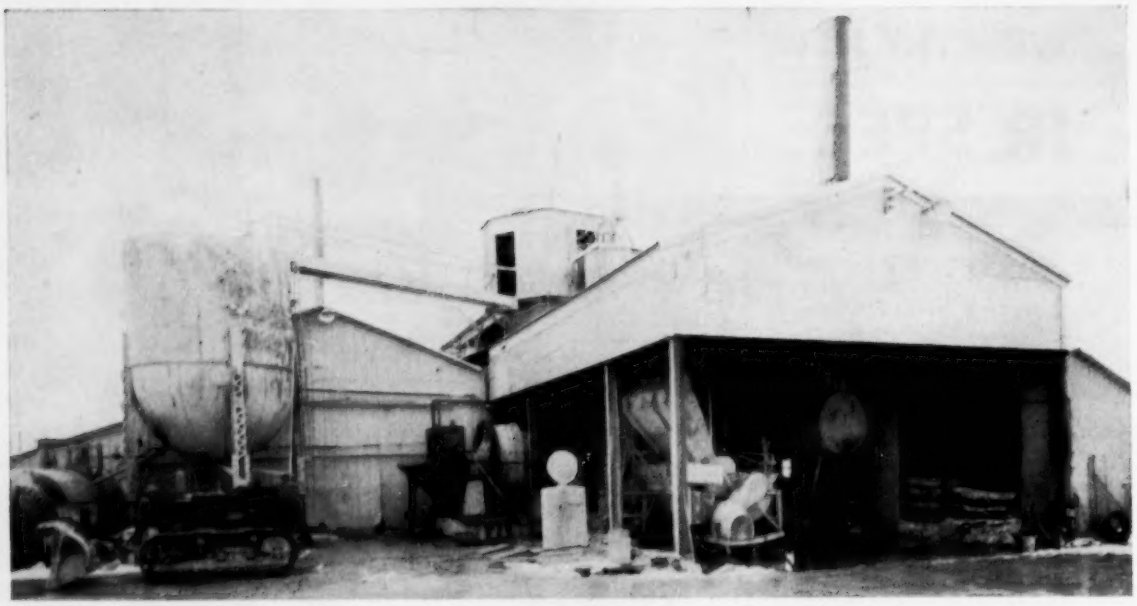
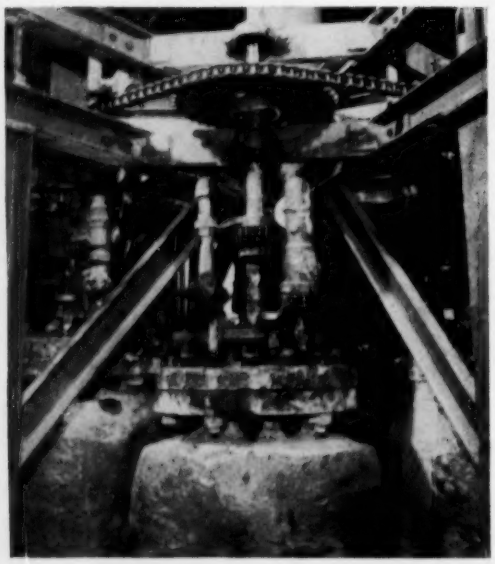
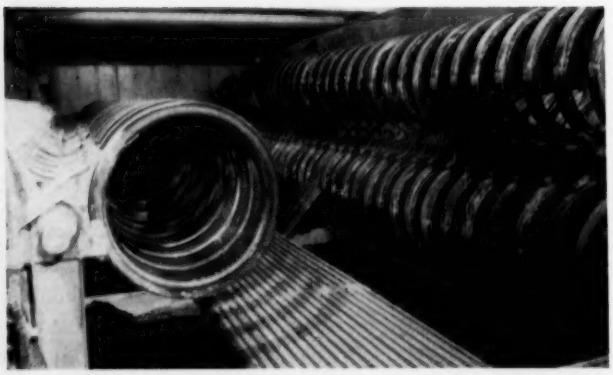
Feed Preparation



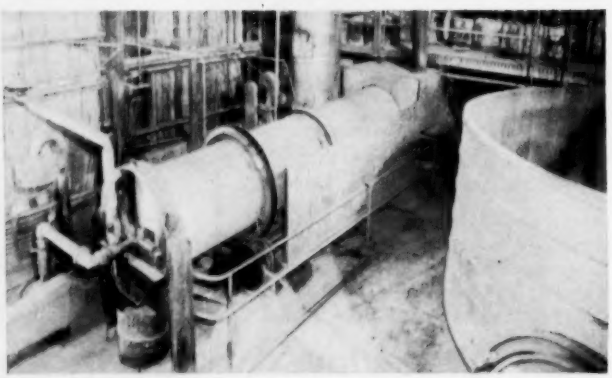
Reaction



Filtration



Purification



At Salt Lake Tungsten refinery, scheelite (calcium tungstate) is upgraded by selectively converting insoluble calcium tungstate to soluble sodium tungstate through reaction with soda ash. After impurities are filtered off, the calcium salt is regenerated by adding lime.

Story begins on p. 44

ANHYDROUS AMMONIA... 250 tons per day

by the exclusive FW sequence

Another Ammonia Synthesis Plant by Foster Wheeler now on stream at Grace Chemical Company

Designed and built by Foster Wheeler, this modern Grace Chemical Co. plant at Memphis, Tenn. has a capacity of 250 tons of anhydrous ammonia per day.

It is another outstanding example of the proved economy and dependability of the FW Sequence — Texaco partial oxidation, FW liquid nitrogen wash and Casale ammonia synthesis. Write for the March-April issue of Heat Engineering, containing the complete story. *Foster Wheeler Corporation, 165 Broadway, New York 6, N. Y.*

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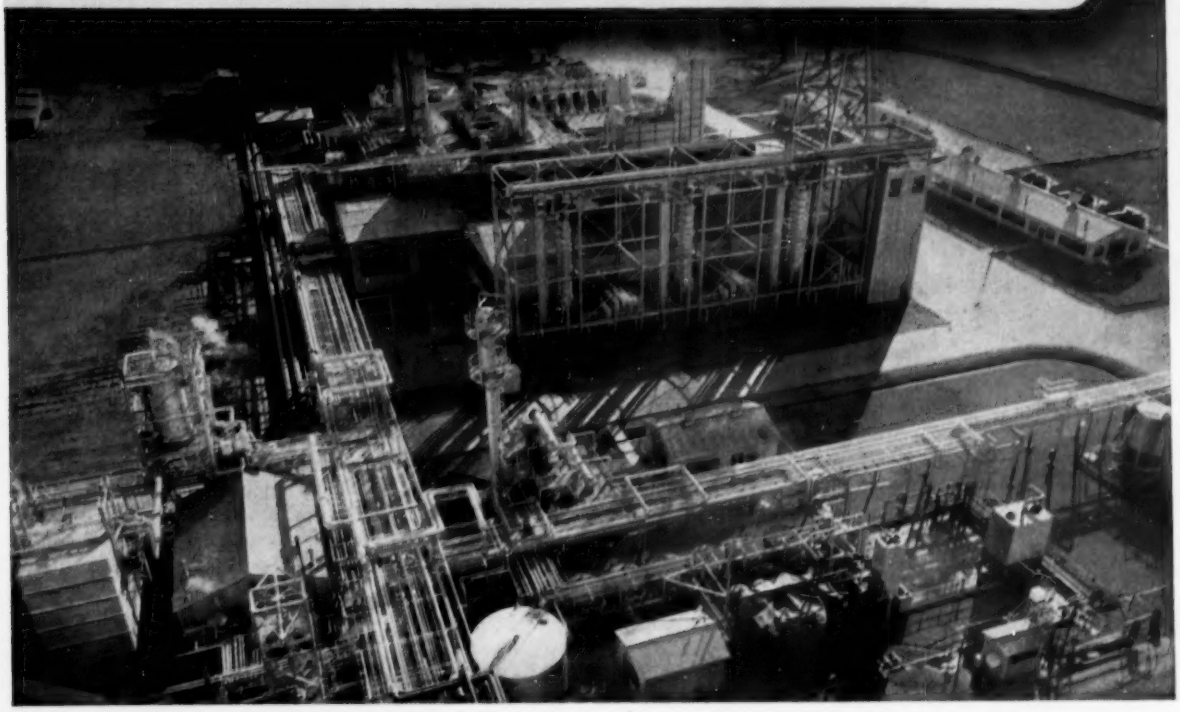


Four Steps to Scheelite

It's hard to tell much about a chemical plant by merely looking at the reactions involved. Take the Salt Lake Tungsten Co.'s new refinery (*see pictures, preceding page*). On paper, it looks a lot like the U.S. Vanadium Corp. refinery at Bishop, Tex. Both upgrade scheelite (calcium tungstate) by essentially the same process: the insoluble calcium tungstate is selectively converted to the soluble sodium salt, impurities are filtered out, and finally the tungsten salt is reconverted to calcium tungstate.

But there's more than geography separating the two operations; there's a significant difference in the type and arrangement of the equipment. At the Salt Lake City plant, the company employs a special filter developed for the job. Also, U.S. Vanadium uses large, rotating, horizontal reactors, whereas Salt Lake Tungsten employs six vertical reactors hooked up in series.

These differences aren't surprising, of course. The two units operate under opposing economic conditions. At Bishop, the refinery is an adjunct to the firm's tungsten mill. Flotation concentrates flow directly to the refinery. Salt Lake Tungsten, on the other hand, is set up to serve a number of scattered mills, none of which is large enough to afford its own refinery.

Close to Sources: Touring the latter plant last week, the CW CAMERA observed the four-step process for making scheelite. The plant is located in Salt Lake City, has access to natural gas for reaction energy, soda ash (from Green River, Wyo.) and sulfuric acid (from Garfield Chemical).

Although the main output of the plant is now scheelite, the government purchase program for stockpile (*see box*) is scheduled to end before the year is out, and SLT is building a pilot plant to test laboratory results on methods of making ammonium *para*-tungstate, tungstic acid and tungsten metal for the civilian market.

The present commercial process takes place in four parts:

• Feed preparation. The concentrates from various sources are mixed to form a uniform mill feed. This is pulped with soda ash and wash water (recycled from the filtration step) to form a slurry running about 50% solids and 7% WO_3.

• Reaction. The pulped concentrate is then fed by gravity to a batch-type pressure vessel where steam pressure at about 220 psi. forces the charge into the reactors. The pulp passes through the six reactors; heat is introduced incrementally from one reactor to the other until the reaction temperature (370 C) and pressure (210 psi.) are reached. Retention time is over two hours. By careful control of the process variables, fluorine, tin and other impurities remain unconverted. The material is discharged through a series of heat exchangers, fed to a surge tank and thence to a large pressure vessel.

• Filtration. Under an air pressure of 50 psi., the slurry is sent to one of two Eimco-Burwell pressure filters. These filters, developed by Burwell and made commercially by Eimco,* consist of a series of frames mounted in 30 pairs on a revolving shaft that rotates the frames between 31 expandable plates each cycle. The plates are closed on the frames with an air pressure of approximately 15 lbs. above feed pressure.

After the feed cycle, high pressure air is introduced into the frame, leaving a relatively dry residue. That's washed preparatory to a final blowing, which leaves the cake containing less than 15% water.

• Purification. Most troublesome impurity is phosphorus. In fact, SLT has found that the best way to keep phosphorus out of the final product is to keep it out in the first place. Molybdenum, which comes through the process in relatively large amounts, can be removed almost completely by precipitating it with hydrogen sulfide. (Present GSA specifications, however, permit molybdenum concentrations of 2.75%, so the firm removes only a portion of it by forming a complex thiomolybdate salt which does not precipitate when lime is added.)

After the calcium tungstate is regenerated (with lime), the scheelite is nodulized in a kiln for sale to producers of ferro-tungsten or as an additive for tungsten tool steel.

Oddly enough, the Russians, who indiscriminately stake out claims to inventions, actually did lay the groundwork for the scheelite process. They stubbed their toes, however, on mechanical difficulties inherent in applying heat and pressure to the highly abrasive solution.

* cf. *Chemical Engineering*, July '54, p. 288.

Making Sure of a Source

Salt Lake City Tungsten Co. (Utah) was organized by Blair Burwell, Sr., in 1953 as an affiliate of Minerals Engineering Co., Grand Junction, Colo. (which he also heads). But in the late summer of that year, before the plant had started operations, Sylvania Electric Products, Inc., obtained a 50% interest in the venture. Reason: Sylvania, which had seen tungsten prices go as high as $80/unit, did not want to remain completely dependent on the vagaries of the controlled world market for tungsten. (A unit of tungsten is 20 lbs. expressed as WO_3. The General Services Administration is currently buying tungsten for the stockpile for $63/unit.)

Basically, the refinery is a restoration of the Reserve Metals Co.'s World War II facilities operated by the U.S. Vanadium Corp. The government plant, however, was torn down and sold —virtually for scrap—and SLT had to build almost from scratch.

The plant now turns out about 4,000 units of WO_3/month, but output could be tripled if additional concentrates of amenable ores were available. In addition to the ores from Mineral Engineering Co.'s Glen, Mont., mill (capacity: 800 tons/day), it gets ores from Ely, Nev.; Bauer, and Delta, Utah; and Boulder County, Colo.

VINYLS with a challenge!

better ways to meet the needs of today's vinyl paints

New Bulletin on BULK HANDLING OF VINYLS

Helpful information on the handling and storage of tank car quantities of vinyl resins has been prepared by National's engineering staff. Pumps, piping, tanks, valves and strainers are among the subjects discussed in detail. A diagram showing the flow of materials from tank car to paint tanks is also included. Be sure to write for your copy of the new bulletin.

INTERIOR WALL PAINTS AT COMPETITIVE COSTS WITH RESYN 12K-51

More and more paint manufacturers are basing interior flat wall paints on National's inherently flexible vinyl copolymer Resyn 12K-51. Improved film structure and film formation *plus* unusually high PVC and competitive raw material costs make this switchover especially attractive.

The new paints are quick drying and offer excellent color retention and scrubability. Their lack of odor adds further appeal to contractors and consumers.

Until recent months Resyn 12K-51 was used mostly as a base for primer sealers and exterior masonry paints. With its use growing for interiors, it now can be stocked in bulk as a vehicle for all three types of paints. This brings additional savings. Handling and inventory costs are reduced, and larger purchases can be made at quantity prices.

INHERENTLY FLEXIBLE VINYL COPOLYMER PROVIDES GREATEST PIGMENT BINDING CAPACITY

Film Fusion Additives Helpful

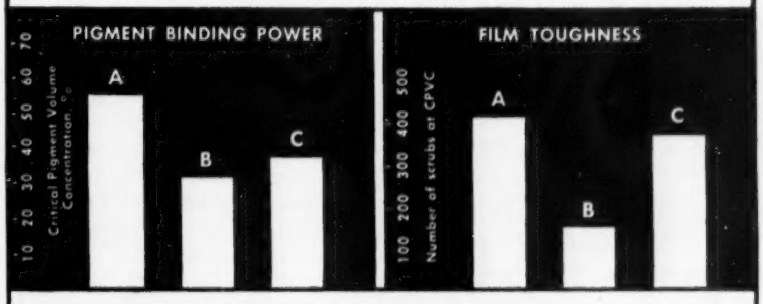
Higher pigment concentrations without sacrificing film toughness and integrity now appear possible in vinyl paints. Completing the first phase of a detailed study, National's researchers report that copolymerization and film fusion additives significantly improve the binding power of resin emulsions—a promising step in the direction of lower raw material costs.

An inherently flexible vinyl copolymer (National's Resyn® 12K-51) and straight PVAc were the resin binders compared in this part of the study. Hexylene glycol, Pycal 94 and methyl carbitol were selected as film additives. Of these, hexylene glycol produced the highest increase in pigment binding power. As shown in the table below, straight PVAc containing no additive gave a CPVC of 32%, with the film failing at 150 scrubs*. An increase of CPVC to 38% and film failure at 380 scrubs resulted when 10% dibutyl phthalate and 7.5% hexylene glycol were added to straight PVAc. On the other hand, Resyn 12K-51 with 7.5% hexylene glycol gave a higher CPVC of 55% and a tough, flexible film failing after 410 scrubs.

Paint makers who wish to test Resyn 12K-51 can do so. Interior formula F-205, a high PVC paint, with excellent performance characteristics, will be sent on request. More data, samples and color information for a complete color line also are available.

***NOTE:** In this study, only the actual resin solids are considered in calculating PVC. With postplasticized PVAc emulsions, both resin solids and plasticizer are sometimes considered as binder in calculating PVC—but if this is done, the PVC's of postplasticized straight PVAc's are even lower than indicated above.

RESULTS AT CRITICAL PIGMENT VOLUME CONCENTRATION



A—Inherently Flexible Vinyl Copolymer Emulsion—National's Resyn 12K-51 with 7.5% Hexylene Glycol.

B—Straight PV Acetate, no additives.

C—Straight PV Acetate with 10% Dibutyl Phthalate and 7.5% Hexylene Glycol.

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	GROCO 27 Regular	GROCO 28 Alkyd Grade
Titre	25°—30°C.	25°—29°C.
Color 5¼" Lovibond Red	4 — 8	1 — 3
Color 5¼" Lovibond Yellow	20 — 40	8 — 20
Color Gardner 1933	3 — 5	2 — 4
Color Gardner 1933—after S. & W. Heat Test	—	5 — 8
Unsaponifiable	3.0% max.	1.5% max.
Saponification Value	196 — 202	198 — 203
Acid Value	195 — 201	197 — 202
Iodine Value (WIJS)	123 max.	125 — 135

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Ounce of Prevention

The unique properties and versatility of a steadily growing number of plastics have been touted highly by justifiably proud producers. Less publicized, though of primary concern to manufacturer and consumer alike, are the hazards involved in plastics production and fabrication.

Going on the theory that "forewarned is fore-armed," the National Board of Fire Underwriters last week published its latest report on fire hazards in the plastics industry.

According to NBFU's survey, fire and explosion risks are greater (from the standpoint of loss severity) in the chemical manufacture of synthetic resins and moulding compounds than they are in the fabrication of end-use products. Both of these operations deal with the same hazardous chemicals, flammable liquids and gases, and combustible dusts. But the risks are considerably less for fabricators processing smaller quantities of plastic materials under less strenuous operating conditions.

Getting down to cases, the report enumerates the major problems to be considered in setting up effective safety controls, cites several examples to illustrate the dangers of each. The comprehensive summary runs the gamut from such obvious hazards as the handling and storage of organic peroxides to less well-known side effects like the formation of toxic fumes from destructive distillation. And to help processors pinpoint their own particular problems, there are appendices listing the thermal properties and burning characteristics of the various plastic materials.

The report goes on to suggest means for establishing a safety program capable of keeping up with continuous changes in materials and processing methods. Stressing the importance of participation at all levels from top management down, it recommends thorough indoctrination of new employees, retraining of all personnel to keep them up to date. In conclusion, NBFU presents a check list of vital plant and equipment facilities that require periodic inspection and maintenance in order to insure safe operation. Special attention is recommended for:

- Process equipment such as heat exchangers, polymerizers, autoclaves, stills, pressure relief valves, compressors, and flash-back arrestors.
- Utility equipment such as main boilers and heating units, electric generators, storage and distribution systems, steam and compressed air lines.
- Tanks and auxiliary equipment such as storage tanks, vacuum and pressure relief devices, gauges, instruments, and flame arrestors.
- Shipping and storage areas, including tank cars, transfer pumps.
- Fire protection equipment such as water storage, piping and pumping facilities (for fire use), permanent installations of foam, fog, spray, gas, or dry-powder extinguishing systems, first aid fire extinguishers, fire trucks and pumpers, and alarm systems.

As the survey points out, most plastics processors are aware of the need for safeguards. But in this rapidly changing field, none can afford to overlook any possible hidden hazards.

A glance at the NBFU report may enable many to save the exorbitant cost of a "pound of cure."

For Sale: Atomic Heat

In the chemical process industry, it's not uncommon practice for a producer to make a profit from the sale of a useful by-product. It is unusual, however, to find such an intangible thing as heat among by-product offerings. But that's just what the AEC has put up for sale to public, cooperative, or private organizations in the vicinity of Los Angeles.

The unwanted thermal energy will be produced by the Sodium Reactor Experiment being built and operated by North American Aviation, Inc. One of five reactor systems designed for the development of economically competitive nuclear power, the SRE will not be equipped with a turbogenerator for the production of electricity. Its primary objective is to develop the technology of reactors utilizing sodium coolant, graphite moderators.

Peak heat load of the project will be about 20,000 kw.—enough to generate approximately 7,500 kw. of electric power. But availability of reactor output will be subject to demands of the experimental program, can't be guaranteed. Only taker to date is Southern California Edison Co., but others may join the fold before the June 13 deadline on proposals.

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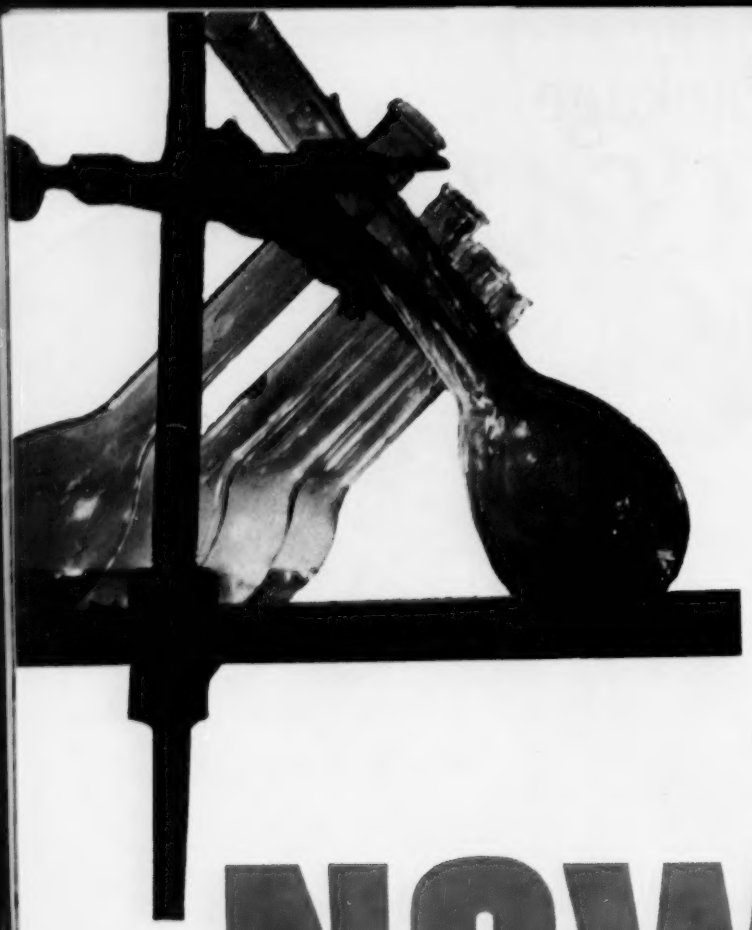

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BRIGHTEST PROSPECT for the direct conversion of fuel to electricity is a new fuel cell developed by the British. Based on the electron exchange in the chemical reaction between oxygen and hydrogen, it produces electric current without the use of intermediate boilers, turbines, or generators. Among its likeliest applications:

- Electric railways. Efficient generation of electricity from stored fuels would permit range of electric trains to be extended beyond existing high-tension transmission lines.
- Electric generating plants. Storage capacity of cells would help to smooth out peaks and valleys of demand, allow plants to be designed for lower capacity.
- Trucks, submarines, surface vessels. Fuel cells provide greater storage capacity per pound, occupy less space than lead cell batteries.

Shortcut to Power

To chemical engineers, who have long sought to bypass electrical generating machinery, Britain's new oxygen-hydrogen fuel cell looks like the first practical straight line between fuel and electricity. Already proved feasible in the laboratory, the cell is currently in a stage of transition to prototype construction of a 2-3 kw. unit.

The model now in operation was backed by the British Electrical and Allied Industries Research Assn. (ERA) and the Ministry of Fuel and Power, designed by F. T. Bacon of Cambridge University's Dept. of Chemical Engineering and T. M. Fry (now with Britain's Atomic Energy Establishment at Harwell). Their goal: to build "long life" into a cell with practical operating efficiences over a wide range of power loadings.

Key to Success: Since the fuel-cell theory was first compounded,* many variations (electrochemical oxidation of hydrogen, carbon monoxide, methane, and carbon anodes by oxygen) have been tried. But Bacon saw the high-pressure hydrogen principle as the best bet for success, has, so far, obtained the most satisfactory results.

Operation of the cell is simply a reversal of the electrolytic dissociation of water. But not so simple are the temperature-pressure balance and physical construction required to make the reaction take place at the desired rate.

Heart of the cell is a pair of circular porous nickel electrodes, spaced 1/16 in. apart between halves of a nickel-plated steel cylinder. Basic pore size of the electrodes is 30 microns, though the inner (facing) surfaces have a maximum pore size of 16 microns. The space between electrodes is filled with electrolyte (27% potassium hydroxide), while the space in either end of the cylinder contains gas—oxygen on the positive side, hydrogen on the negative.

Oxygen, absorbed and activated by a thin layer of oxide on its electrode, reacts with water in the electrolyte to form hydroxyl ions. These ions migrate to the negative electrode where they combine with hydrogen to give up their electrons, establishing a difference in potential between the electrodes. The resultant electromotive force causes current to flow from the hydrogen to the oxygen electrode via whatever circuit is attached.

Producing 0.8 volts (90% of the theoretical maximum), the 5-in.-diameter laboratory model supplies 58.9 amperes current, or 47.2 watts of power for the unit as a whole. But for the prototype, Bacon proposes to quadruple the current with a 10-in. cell, step up voltage by increasing the number of cells in series.

The cell operates between 140 and 240 C at a pressure of 600 to 800 psi. Gases are supplied at a small positive pressure of about 1.5 psi. to prevent electrolyte from penetrating beyond the surface layer of small pores.

Though the O-H fuel cell is theoretically reversible, the model has been run in only one direction, on gases produced by a separate electrolyzer.

To Its Credit: One of the chief advantages of Bacon's cell is the long life of the sintered nickel electrodes. Previous cells with reasonable efficiency suffered from rapid deterioration. But Bacon's model has been run over 1,000 hours, appears to show no ill effects (other than temporary drop from 90 to 50% in efficiency) even under severe overloads.

Of particular interest to traction system operators is the new cell's weight advantage, "unlimited" storage capacity. For example, lead batteries used for railway service have a weight-to-power ratio of about 85 lbs./kwh. of power stored. And their capacity is limited to a finite value determined by their size. The oxygen-hydrogen fuel cell, on the other hand, would weigh in at roughly 50 lbs./kwh., with a capacity limited only by the available supply of gas under pressure.

Of course, these advantages are not easily gained without some sacrifice. For one thing, Bacon estimates the over-all efficiency of a typical fuel cell for a traction unit would be only 40% as compared with 75% for conventional lead cells. But he also feels that the fuel cell's flexibility and ability to handle prolonged periods of overload will go a long way to recommend its use.

Awaiting Outcome: Results of the prototype development will be of more than academic interest to many of Britain's heaviest electric power consumers and producers. But most have adopted a wait-and-see attitude, want to see it working before they show their hand. Some who could profitably use fuel cells:

- British Transport Commission, top body in charge of Britain's nationalized railways, could use them to equalize rush-hour demands and slack periods, to extend range of electric trains beyond present limits of high-tension transmission service. Oxygen and hydrogen electrolyzed from water during off-load hours and bottled under pressure would furnish independent power for engines, extra capacity at central generating plant.
- London Transport Executive, which runs London's bus and subway system, also has problem of leveling peaks and valleys of demand. LTE now wonders if the fuel cell will be

* In 1839, Sir William Grove outlined a device for combining oxygen and hydrogen, routing the electron exchange through a circuit to produce a small electric current.

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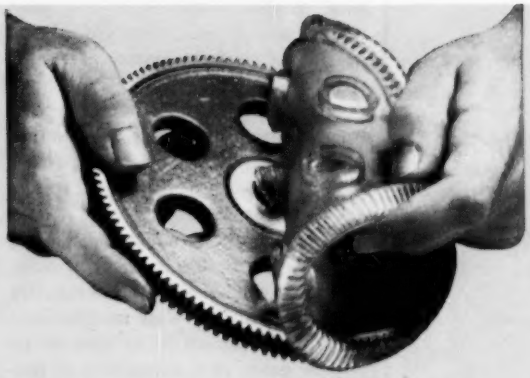
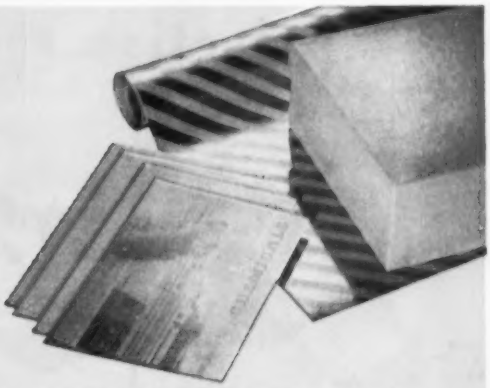
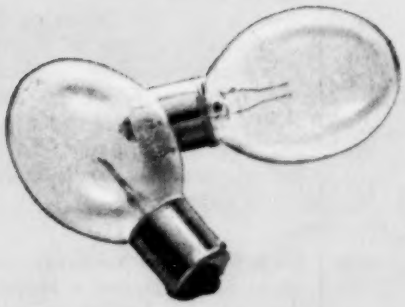


PEELABLE PLASTIC PACKAGING — Peelable plastic made with Eastman cellulose acetate butyrate is a clean protective packaging for fine tools, dies, gages, gears, machinings and many other metal parts. Applied as a hot dip, the thick, tough butyrate film cushions delicate parts against shock and protects them against corrosion and rust. When the part is ready for use, the transparent plastic skin is easily peeled off.



COATINGS FOR PAPER — Decorative and protective paper coatings made with Eastman cellulose acetate butyrate offer outstanding gloss. They are water white and do not discolor on aging. They retain high strength and flexibility at low temperatures, are heat sealable and are easy to apply either as a solvent solution or as a hot melt with existing commercial equipment. Mileage per gallon is high.



FLASHBULB COATINGS — When a flashbulb flashes, the sudden, intense heat sometimes fractures the glass envelope. Seeking a way to confine the broken pieces, flashbulb manufacturers turned to Eastman cellulose acetate. Applied in the form of a lacquer to both the inside and the outside of the fragile glass bulb, the tough, flexible acetate film provides an invisible jacket that serves to imprison the fragments of glass.

OUTDOOR LACQUERS FOR ALUMINUM — Lacquers made with half-second butyrate (Eastman's low viscosity cellulose acetate butyrate) promise a new kind of protection for outdoor aluminum surfaces. Half-second butyrate is a stable, dry powder. It is highly soluble in economical solvents. No other easily sprayable film former exhibits such a high degree of ultra-violet light stability, strength, flexibility and all-'round resistance to attack.

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PRODUCTION . . . .

able to do economically what the lead cell accumulator hasn't.

• Central Electric Authority operates the nationalized power industry, has financed fuel cell research of its own, primarily on redox and high temperature types. Since virtually all of Britain's power comes from coal, CEA would prefer a cell capable of operating on materials readily extracted from that source. But it has carefully noted the long life of Bacon's oxygen-hydrogen cell, doesn't rule it out as a possibility.

Fuel cell development has limited significance, for the moment at least, as far as the chemical process industry is concerned. But with modifications that would permit it to operate on impure gases, or a cheap way to produce hydrogen and oxygen under pressure, it could become a handy source of auxiliary power for electrochemical and other high-consumption operations.

EQUIPMENT . . . .

Two-Speed Kneader: For intensive mixing and kneading of very stiff plastic masses or compounds, Charles Ross & Son Co. (Brooklyn, N. Y.) offers its new line of heavy-duty double-arm kneaders. Available in various sizes from 1 pt. to 150 gal., they feature two-speed motors, close clearance between arms and trough for maximum shear and dispersion of heavy materials.

•

NAK Valve: The Annin Co. (Los Angeles) has engineered a Model 1401 series of control valves for use with NAK and similar molten-metal services. Bodies range from ½- to 6-in. sizes, are rated for operation at pressures to 150 psi., temperatures to 1600 F.

•

Pilot Filter: To facilitate filtration studies needed for the selection of production filters, American Plant Equipment Co. (New York) has developed the Pronto-Junior pilot filter. Using 1-3 leaves with a maximum filtering area of 1 sq. ft., the unit provides accurate empirical data on filtering rates, pressure variation, filter cake density, and washing efficiency with fabric or precoat filter mediums. Construction is of type 316 stainless steel designed for a maximum pressure of 80 psi.

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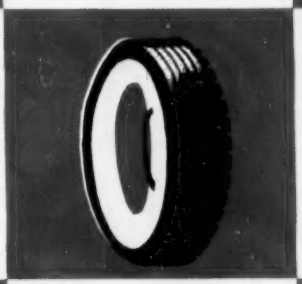

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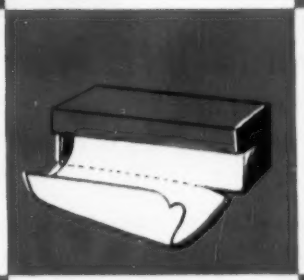
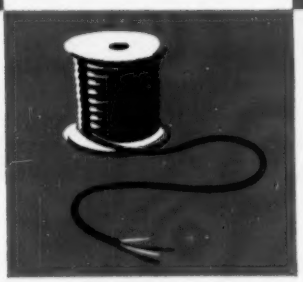
MOLDED PRODUCTS

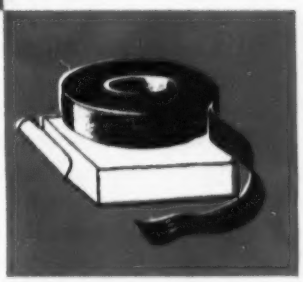
PRINTING INK



PAPER PRODUCTS



ELECTRICAL INSULATION



ADHESIVE PRODUCTS

it pays to know about BARRETT CUMAR® RESIN

Ever since we first produced "CUMAR" Resin in 1913, this remarkably versatile thermoplastic resin has been constantly improved. Today it is available in numerous grades, each of which is produced under close control to assure a resin suited to the most exacting user's requirements. Every day "CUMAR" Resin provides successful and economical solutions to production problems in a wide variety of industries.

A valuable "Cumar" Resin Booklet is yours for the asking. 64 handsomely illustrated pages, full of informative details on "CUMAR" Resin's uses, product data and properties, testing methods, etc. Please send in your request on company letterhead.

BARRETT DIVISION, Allied Chemical & Dye Corporation, 40 Rector St., New York 6, N. Y. In Canada: The Barrett Company, Ltd., 5551 St. Hubert St., Montreal.

Barrett®

BARRETT CHEMICALS

CHEMICAL PROGRESS WEEK—MAY 16-21

187

If you're valving Corrosive Fluids... you need all 3
NO PACKING WORRIES
NON-CONTAMINATING CONSTRUCTION
LEAK TIGHT CLOSURES
Hills-McCanna rubber lined valves in rayon plant service.

get them all in 1.... with Hills-McCanna Diaphragm Valves

Ordinary valve worries of leaking packing, clogged bonnets and corroded working parts are eliminated by the unique design of the Hills-McCanna Saunders Patent diaphragm valve. A tough, resilient diaphragm completely *isolates* the bonnet and its working parts from the valve body. The *cushion* closure is drip tight. Surface irregularities or scale are no cause of leakage because the diaphragm *accommodates* itself to them . . . like a tire to small stones. Packing worries are *easily* forgotten, too—no packing is needed because no fluid can enter the bonnet.

Available with choice of 15 diaphragm materials, body materials of *any* machinable alloy and a choice of linings, Hills-McCanna valves range in sizes from ⅜" through 14". May be used at pressures to 150 psi, temperatures to 350° F. Choice of remote, handwheel or lever operators.

If *you* valve corrosives, write for further information today! HILLS-McCANNA CO., 2445 Nelson St., Chicago 18, Illinois.

HILLS-McCANNA

saunders patent diaphragm valves

Also Manufacturers of
PROPORTIONING PUMPS
FORCE FEED LUBRICATORS • MAGNESIUM ALLOY SAND CASTINGS

PRODUCTION. . . . .

Sulfur Burner: The Chemipulp-KC jet-type sulfur burner, now being offered to the pulp and chemical process industries by Chemipulp Process, Inc. (Watertown, N.Y.), is a radical departure from conventional rotary burners and combustion chambers. Operating efficiently at all sulfur dioxide concentrations from 12-18½%, it burns molten sulfur sprayed into the combustion chamber as a fine mist. Units are available in several capacities ranging from 1-25 tons/day.

•

Cascade Cooler: Two types of impregnated graphite have been teamed up by Falls Industries, Inc. (Solon, O.) to permit efficient cooling of corrosives at temperatures up to 700 F in the open atmosphere. Inlet tubing of extruded Graph-I-Tite (carbon-impregnated), capable of withstanding temperatures to 5700 F, comprises primary cooling section, while Impervite (resin-impregnated) is used for sections operating below 340 F. Big advantage, says FI, is improved extrusions which eliminate laminations, normal spalling tendency of graphite at high temperature limits.

•

Two-point Control: The Foxboro Co. (Foxboro, Mass.) has engineered a one-instrument device to prevent both freeze-up and overheating of refrigerant-cooled batch polymerizing kettles. The system uses an Auto-Selector which acts on refrigerant outlet temperature to reduce coolant flow, on kettle temperature to increase cooling action. Added advantage over single-action instruments, says Foxboro, is the continuous regulation of refrigerant flow during kettle charging operations.

•

Glass Exchanger: For processing jobs where chemical resistance and product purity are primary considerations, Corning Glass Works (Corning, N.Y.) is offering a new 50-sq.-ft.-capacity shell-and-tube heat exchanger constructed of Pyrex brand glass. Body of the unit is standard 6-in. glass pipe, tubes are ¾-in.-thin wall tubing. Easy to install and maintain, the unit can be used interchangeably as a condenser, cooler or heat interchanger. Resistant to all acids except hydrofluoric, it is designed to withstand pressures to 20 psi., temperatures to 375 F on the shell side, 200 F on tube side.

DOW

GLYCERINE

from

DOW

is on its way!

Dow will soon be on stream with commercial production of synthetic glycerine.

The new Dow glycerine plant is indeed a very substantial one in size. Important, too, is the fact that Dow is basic in this operation—all raw materials required in glycerine production are being manufactured by Dow. These factors are your assurance of stability of supply.

Do your future planning with all the facts—send for an experimental sample and evaluate the material and the quality in your own lab. THE DOW CHEMICAL COMPANY, Midland, Michigan, Dept. OC 804B.

you can depend on DOW CHEMICALS DOW

GOLDEN AGE: Art, color, imagination, and careful editing team to herald new era for brochures.

Spruce-Up Time for Booklets

It's a trend: chemical companies are streamlining their technical literature with sleek appearance, novelty, conveniences, and readable, oriented text.

Literature competition and success as a sales tool are the reasons why management is okaying record brochure budgets.

After the salesman has snapped his sample kit shut and pumped the purchasing agent's hand goodbye, very often the only tangible reminder of his visit is the technical bulletin that he leaves behind. Time dims persuasive arguments, samples often go on a shelf, but the booklet remains to tell its sales message another day. That's one of the chief incentives behind the current industrywide rush to spruce up the staid, dry-as-calcium-chloride technical brochures.

In the paint raw materials industry, in fine organics, in bulk chemicals, in pharmaceuticals – in short, in just about every part of the chemical complex–the realization is taking root that:

- You compete with literature as well as with products.
- Everything you do reflects upon the product, and you can't talk high quality with poor literature.
- The technical booklet is a key sales tool (*CW, Oct. 23, '54, p. 101*) not only for the customer but for the salesman himself, who often sells a staggering array of products.

All this may mean that the booklet of the future is apt to sport an invitation-to-reading appearance accomplished by liberal use of color, layout, and a distinctive, "digestible" text; a raft of convenience aids such as punch holes, spiral bindings, eye-easing green paper, and index tabs; and specifically oriented texts, each beamed to one industry and/or one purchasing influence.

Far fetched? Not at all. Many of these improvements are already being incorporated in the literature of many chemical companies. And more firms are switching over all the time. (Pfizer within recent months, Celanese and Armour in the near future.)

Appearance: Glamor is busting out all over. The plain cover will soon be passé as many concerns convert to sleek, eye-catching color covers. (Du

THERE is a reason for the very substantial tonnage of sodium phosphates Blockson ships to industrial areas far from our greatly expanded plant facilities here in Joliet. That reason is continuous prompt shipment—a few bags or many carloads—minus the red tape usually associated with an operation as large as ours.

Again and again customers tell us they couldn't get better service if our plant were located in their own industrial community.

There is a reason for that, too. At Blockson, production and sales are so closely coordinated that a single collect phone call is all that is required to expedite your unforeseen needs and get your sodium phosphates en route the very same day if it is humanly possible, and most frequently it is.

We welcome the responsibility of functioning as an arm of our customers' production setup, minimizing their inventory and warehousing expense, timing and dovetailing dependable shipments with their own processing operations and at all times providing a uniform and dependable competitively priced product—readily available in your required granulations and specifications.

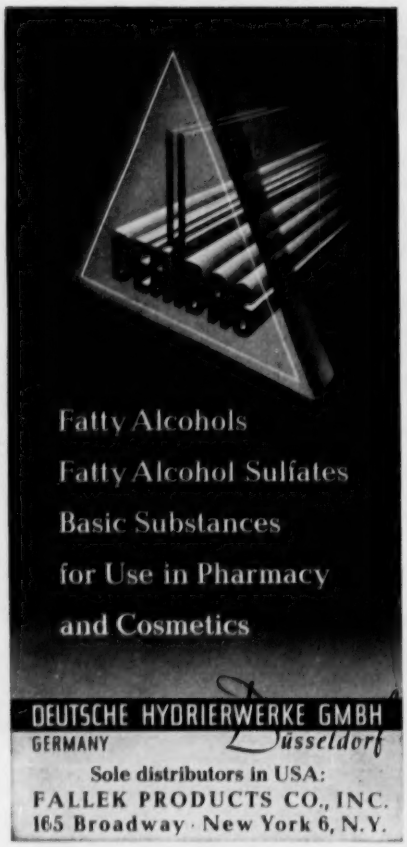
The new Blockson catalog and handbook is yours for the asking.

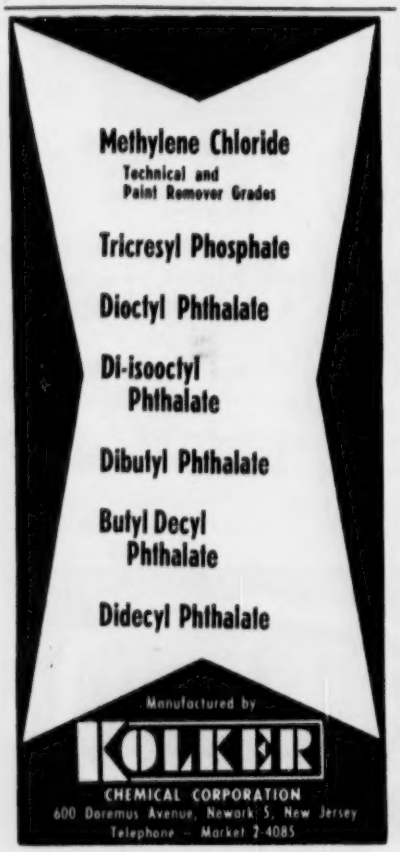
BLOCKSON CHEMICAL COMPANY
Joliet, Illinois

- *Sodium Tripolyphosphate*
- *Trisodium Phosphate*
  CRYSTALLINE • MONOHYDRATE
- *Tetrasodium Pyrophosphate*
  ANHYDROUS
- *Sodium Polyphos*
  (SODIUM HEXAMETAPHOSPHATE)
  (SODIUM TETRAPHOSPHATE)
- *Sodium Acid Pyrophosphate*
- *Trisodium Phosphate Chlorinated*
- *Disodium Phosphate*
  ANHYDROUS • CRYSTALLINE
- *Monosodium Phosphate*
  ANHYDROUS • MONOHYDRATE

- *Sulfuric Acid*
- *Sodium Fluoride*
- *Sodium Silicofluoride*
- *Hygrade Fertilizer*
- *Teox 120*
  NONIONIC SURFACTANT

BLOCKSON





DISTRIBUTION . . . . . .

Pont, Allied, Atlas Powder, Carbide, Eastman Chemical Products, Dow, to name a few.) Inside, color generously complements more illustrations and more "air" (space) in the layout. (National Aniline runs a color stripe through lists of chemical reactions.) Standardization of booklets, both in size and textual format, represents another trend. High-quality stock, often glossy, is also in vogue. (But Pfizer recently chose buff for less eye-strain.) And to ensure expert color use and layout, many are now retaining outside specialists (Glidden, Sherwin-Williams, Pfizer).

Message Presentation: More and more companies are canvassing their personnel who have contact with customers—salesmen, management men, technical service personnel, and advertising people—for advice on tailoring booklets to the customer's needs. Copy is getting crisper and more readable. Booklets are veering away from "long-hair" journal style. Increasing attention is being paid to the organization of the material within the bulletin. (One "ideal" combination: first few pages to top management, with generalities about performance; next, cost and specification comparisons for the purchasing agent; last, technical data for the bench chemist.) Too, some companies report a tendency to include much more technical data in their literature.

Message Orientation: Targeting takes three directions. For a given product, booklets are increasingly being slanted to a:

- Specific industry. Each industry (provided use of the chemical is sufficiently different) gets its own literature.
- Specific purchasing influence. The top executive, the research man, the purchasing agent each gets a separate brochure. Although most firms haven't gone this far yet, many, *CW* learns, consider this move inevitable. And more concerns are now directing special sections of a general booklet to a specific influence.
- Specific product or product line. The tack now is away from catalogs, toward literature on one product or product line. Carbide is moving to product-line brochures; Solvay, Eastman Chemical, and Shell are favoring specific product leaflets. All are doing so for economy besides more effective sales campaigning. It's wasteful to expend a costly catalog on a one-use client or maintain hundreds of booklets on similar materials.

Convenience Features: The swing towards easy-to-use gimmicks is one of the most marked trends. Company after company is punch-holing literature along the binding, and adding indexes and index tabs. Some punch-holers: Emery, Quaker, Carbide (on data sheets), and Allied. Tabbers include Marathon, Ringwood, Emery, Pfizer, Reichhold, and Quaker. Carbide's spiral binding of "recipe-type" booklets (to lie flat or stand up) is another example of catering to convenience. A heavy-duty binding on its revised catalog is Eastman Chemical's contribution to service ability.

Curiously, convenience upgrading is a two-way street. Several firms are color-coding their literature for easy warehousing (Reichhold, Solvay).

Novelty Features: Getting a booklet to "stand out from the pack" is a problem all designers face now. Several are discovering the solution in a distinctive style. Monsanto now offers huge wall charts on acrylonitrile and *o*-nitrochlorobenzene that flow-chart all the principal chemical reactions (*see cut*). Atlas Powder provides its customers with a special surfactant calculator. Distillation Products Industries (division of Eastman Kodak Co.) has adopted a breezy conversational style in a semi-technical type of promotional literature. Foote Mineral and Commercial Solvents are now trying a "chic" style for some of its promotion.

Booklet Budgets: With the upgrade push on, it only follows that costs are racing skyward. Part of the added expense stems from a "more products-more booklets" reason, part from increased production costs, and much from the upgrading itself. Almost all contacted by *CW* concurred that budgets were at record levels. Typical comments: "twice what it was five years ago"; "now spending much more"; "substantially higher than in past few years"; "we're 7% above last year."

Happy medium: It's possible, many ad executives feel, to carry the literature's new era too far—that dazzle will lose effectiveness through familiarity, or even alienate some. But, in the middle, they continued, there's plenty of room for sparkling color, snappy text, functionality to hone up a first-rate sales tool.

Store and Distribute

your bulk liquids
as the market demands—
with no capital investment

GENERAL AMERICAN TANK STORAGE TERMINALS

a division of GENERAL AMERICAN TRANSPORTATION CORPORATION
135 South LaSalle Street · Chicago 90, Illinois

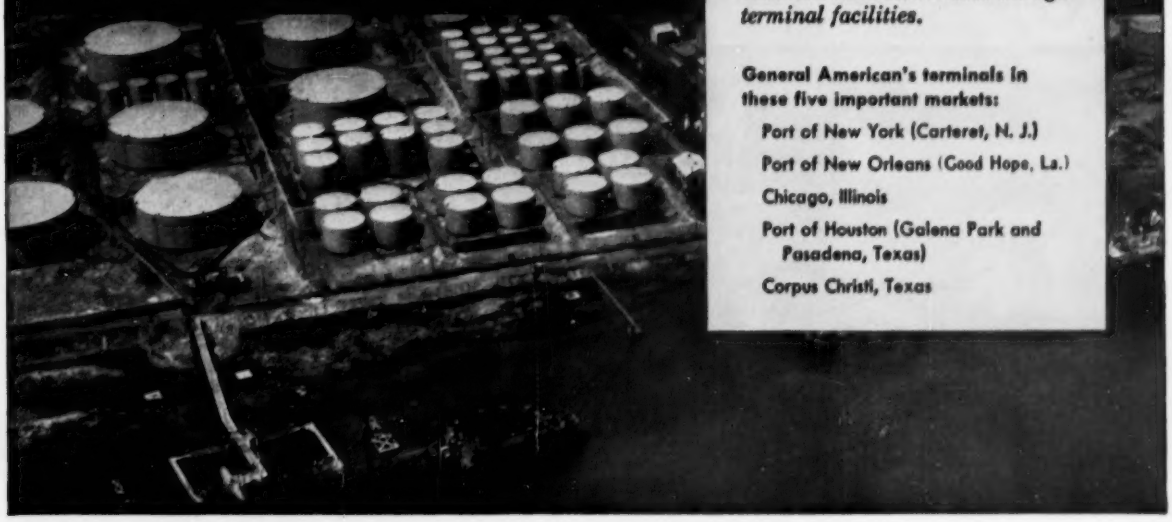
In five important markets, General American offers you complete bulk liquid storage facilities. Many leading shippers and processors have found these facilities add profit when they market their bulk liquids. They can maintain inventories of their products for distribution at the right time and place; gain economies of shipping in bulk; and *conserve* capital.

Modern storage tanks . . . for anything that flows through a pipeline . . . are yours to use. You can be sure of privacy. Carefully guarded manifolds, pipes and pumps to protect your product against contamination. Barrelling, drumming, canning and blending services at New York, New Orleans and Chicago. All this, without capital investment on your part!

Ask about the marketing advantages you receive from leasing General American's tank storage terminal facilities.

General American's terminals in these five important markets:

- Port of New York (Carteret, N. J.)
- Port of New Orleans (Good Hope, La.)
- Chicago, Illinois
- Port of Houston (Galena Park and Pasadena, Texas)
- Corpus Christi, Texas



AT ENJAY: Customer problems . . .

. . . are discussed

Technical Services Pace Expansion

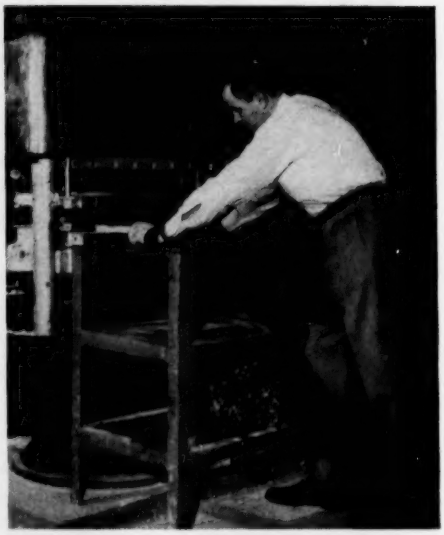
Ivory towers of research continue to move closer to reception rooms as customer service gains importance and technical missionaries prove the value of over-the-lab-bench selling.

Last week, for example, the Enjay Co. formally opened doors to a new laboratory (Linden, N.J.) that will operate as an essential part of the firm's sales team. Spurred by an anticipated increase in demand for butyl rubber—following its return to private industry under the Rubber Facilities Disposal Act—facilities for use-research on additives and chemical intermediates have been extended to meet the requirements of butyl consumers.

Normal activities will consist of three primary functions: application research to find new uses for petrochemicals; technical trouble-shooting on customer problems; and product promotion through the preparation of technical literature to aid the firm's salesmen.

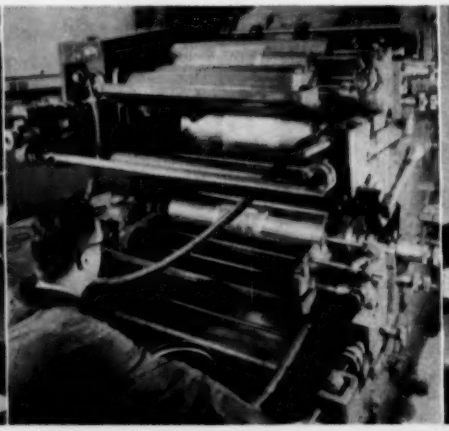
The Bakelite Co. Packaging laboratories (Bound Brook, N.J.) has as its sole objective the stimulation of plastics sales through research on packaging methods. Typical activities are stress-fatigue studies, the adaptation of existing over-wrap machinery to handle thermoplastic films, and color-flexographic printing of labels.

Specifications for materials and consumer packages are the ultimate goals, while close liaison with extruders of films, converters, and end users will keep research channeled in-



. . . and researched in the new laboratory.

AT BAKELITE: Materials testing

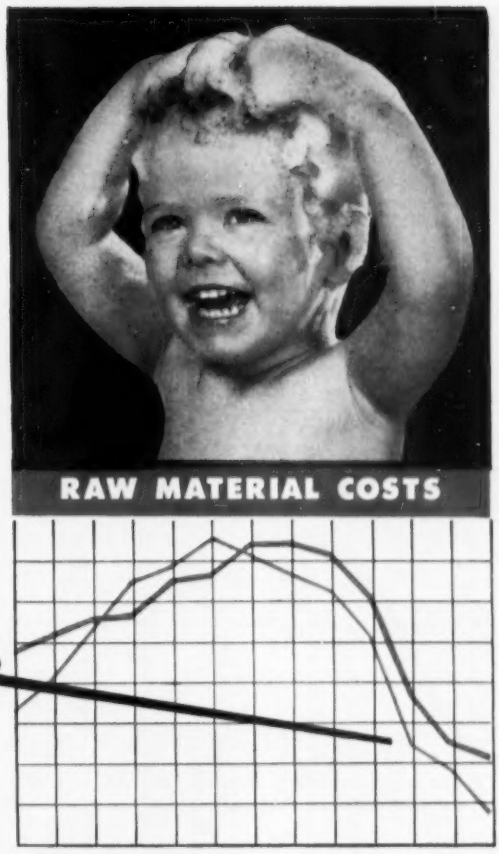


. . . and labeling studies

. . . lead to better packaging.

HE CUTS YOUR COSTS...

when he's put to work in your shampoo



The ULTRAWETS *wet, penetrate, clean, emulsify.*

Have you met the ULTRAWETS, the alkyl aryl sulfonates that have saving ways with good shampoos?

Here's why you'll want to know them better . . .

ULTRAWETS in your shampoo formulation may help you to improve your present product. On top of that, these superior alkyl aryl sulfonates are far less costly than many other types of detergents and will lower your costs.

Add the inevitable consumer acceptance of these new shampoos, and you have a combination of advantages well worth going after. Let us help you. Our sales engineers will be glad to work with you to develop the ULTRAWET-base shampoo formulation to meet your performance requirements. Just send the coupon or write one of the offices listed.

THE ATLANTIC REFINING COMPANY
Dept. H-52, Chemical Products Sales
260 South Broad Street, Philadelphia 1, Pa.

Please send information on use of ULTRAWET in shampoo.

Name _____

Position _____

Company _____

Address _____

ATLANTIC
PETROLEUM
CHEMICALS

Philadelphia, Providence, Charlotte, Chicago
In the West: L. H. Butcher Co.
In Canada: Naugatuck Chemicals Division of Dominion Rubber Company, Ltd.
In Europe: Atlantic Chemicals SAB, Antwerp, Belgium

take a lesson from Simple Simon

Poor Simple's creel was always empty . . . he just never realized no matter how attractive the bait, it has to be seen in the right places.

That's why over 530 advertisers in 1954 used the BUYERS' GUIDE to keep their product lines before chemical process buyers. Because the GUIDE is the foremost purchasing authority for both chemicals and process equipment, they know their sales lure will be seen by the right men at the right time . . . when purchasing transactions are underway.

Why don't you reserve space in the 1955 edition right now. Ad units are available in a variety of sizes to fit any ad budget. Don't wait, act now! Write Buyers' Guide Manager, 330 West 42 St., New York 36, N. Y.

Buyers' Guide Issue of . . .

Chemical Week

McGraw-Hill Publishing Company
330 West 42nd Street, New York 36, N. Y.

to profitable directions.

The mushrooming of such laboratories stresses the point that the complexities of product application, the pressure of competition, and the buyer's increasing expectation of the fringe benefits of technical service are all contributing to an inexorable migration of researchers toward the bustle of the chemical market place.

Freight Battle

The freight hassle in San Francisco last fortnight moved into high gear; and because the case may set important precedents, chemical exporters will be watching for the verdict with more than casual interest.

Meanwhile, the American Potash & Chemical Corp., whose action against the Pacific Coast European Conference originally precipitated the affair, temporarily side-stepped the full force of the mix-up by settling out of court.

The Federal Maritime Board problem (*CW, May 7, p. '54*) is to determine if members of the conference can force U.S. exporters to deny sales to foreign buyers (who are exercising their rights under f.o.b. or f.a.s. contracts) if they refuse to use conference vessels. Mitsui, the nonconference line involved, charges that the action constitutes unlawful coercion of foreign buyers and U.S. exporters, is detrimental to commerce, and is unfair to Mitsui.

Mitsui won an early advantage by obtaining a subpoena requiring the conference to submit many of its records on f.o.b. and f.a.s. sales; then the conference's cause was dealt a further blow by FMB examiner A. L. Jordan's denial of a countersubpoena for Mitsui records.

Riding high on this initial advantage, Mitsui's aggressive attorney, Alan Wohlstetter, added to the conference's troubles by vigorous examination and cross-examination of witnesses. An American Potash traffic manager stated that movement of cargo on nonconference lines is not considered a contract violation by his firm, and further, that it is illegal to sign a rate agreement pertaining to f.o.b. and f.a.s. transactions. (In answer to questions by conference attorney James, he held that American Potash could not subscribe to a rate agreement which excluded all f.o.b. and f.a.s. transactions because the firm must maintain equality with its competitors.)

A number of firms outside of the chemical industry were drawn into the fray as witnesses for both parties. An attempt was made by the Mitsui attorney to demonstrate that foreign buyers had dictated what carriers must be used, even before Mitsui entered the trade. A representative of Stauffer Chemical Co., subpoenaed as a witness, indicated that Stauffer had not been denied conference rates because the company supplied f.o.b. or f.a.s. cargo that moved on nonconference ships.

For the conference, attorney James' line of direct and cross-examination throughout the hearing seemed aimed primarily at establishing the desirability of maintaining stability of rates.

Examiner Jordan's recommendation will be submitted to the Federal Maritime Board in two or three months and the board will then make a final decision. Meanwhile, American Potash's out-of-court settlement with the conference will not be approved by the FMB until the Mitsui controversy has been resolved.

With so many interests pulling in diverse directions, it is anybody's guess where the board will establish a point of equilibrium.

•

Expanding Sales Coverage:

• American Cyanamid Co. is gathering all its Cincinnati office and warehouse facilities into one building to improve sales and service. The five divisions that will share the new quarters in Evendale, a suburb of Cincinnati: Fine Chemicals, Lederle Laboratories, Industrial Chemicals, Pigments, and Plastics and Resins.

• Tragacanth Importing Corp. has moved its sales and executive offices as well as its laboratory control department to larger quarters at 141 E. 44th St., New York.

• Velsicol Corp. sales and distribution activities in foreign markets and on the Eastern seaboard will now be directed from the company's new quarters in the Empire State Building, New York.

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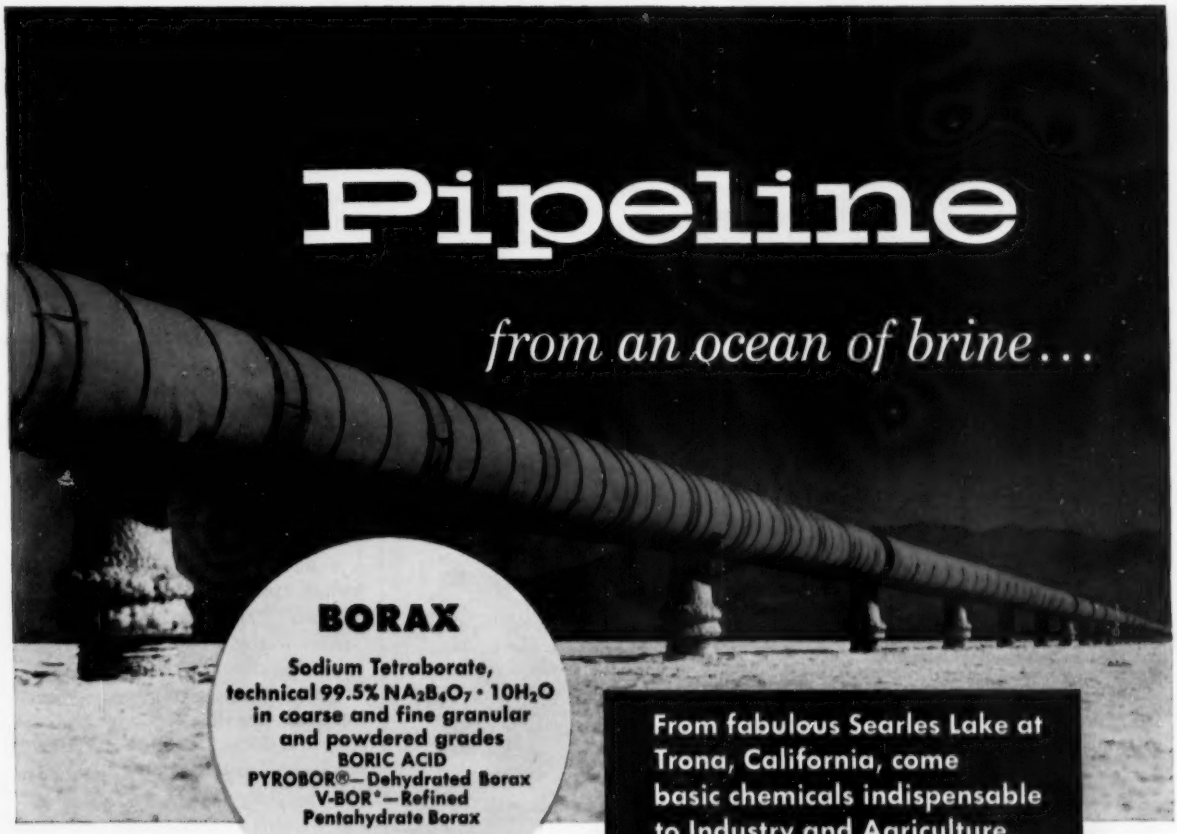
For Tomorrow's Reference: A 100-p. Directory of Western Chemical Producers has been compiled by Stanford Research Institute in cooperation with Western Chemical Market Research



BORAX

Sodium Tetraborate, technical 99.5% $NA_2B_4O_7 \cdot 10H_2O$ in coarse and fine granular and powdered grades
BORIC ACID
PYROBOR®—Dehydrated Borax
V-BOR*—Refined Pentahydrate Borax

From fabulous Searles Lake at Trona, California, come basic chemicals indispensable to Industry and Agriculture.

POTASH

Agricultural Muriate 95-98% KCl, Chemical Muriate 99.5% KCl, and Sulphate 95-98% KS_2O_4

American Potash & Chemical Corporation

TRONA — INDUSTRIAL AND AGRICULTURAL CHEMICALS

Offices:	3030 West Sixth Street, Los Angeles 54, California 99 Park Avenue, New York 16, New York 214 Walton Building, Atlanta 3, Georgia
Export Division	99 Park Avenue, New York 16, New York
Plants	Trona and Los Angeles, California; San Antonio, Texas

LITHIUM

Lithium Carbonate, Lithium Chemicals, Lithium Ores

SODA ASH

Sodium Carbonate, technical 99.2% Na_2CO_3 58% Na_2O in granular and fine granular grades

SALT CAKE

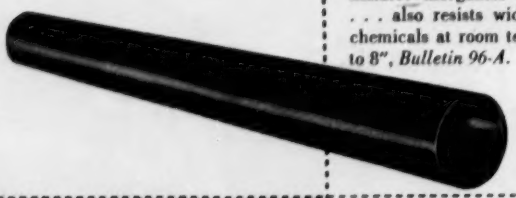
Sodium Sulphate Anhydrous, 97.0% Na_2SO_4 minimum, in regular and industrial grades

*Trade Mark AP&CC

Producers also of—BROMINE CHEMICALS, and a diversified line of specialized agricultural, refrigerant and industrial chemicals

FOR HOT CORROSIVES:
ACE TEMPRON

Heat-resistant nitrile hard rubber pipe handles inorganics at 250-275 deg. F. . . . also resists wide range of organic chemicals at room temperature. Sizes 1" to 8", *Bulletin 96-A.*

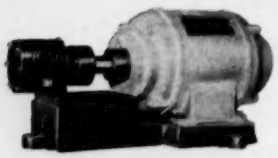


ACE chemical equipment

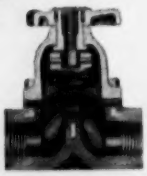
"more resistant to more corrosives"

From this "super-market" of corrosion-resistant equipment backed by more than a century of engineering experience you can select with confidence.

MIGHTY MIDGET
for pumping acids



Jabsco neoprene-impeller pump made of ACE hard rubber outlasts, out-pumps anything in its pressure, size and price class. Capacity from 15 gpm. at 22 ft. head to 5 gpm. at 72 ft. head. *Bulletin 97-A.*



VALVES
for all-plastic piping systems

Trouble-free plastic diaphragm valves . . . choice of general-purpose rubber-plastic blend, Ace Parian (polyethylene) or Ace Saran. Handles most corrosive chemicals and food ingredients. Sizes ½" to 2", 50 psi. at 77° F. *Bulletins 80 and 351.*

1001 USES *for ACE-FLEX Tubing*

Excellent chemical-resistant, all-purpose flexible plastic tubing. Sparkling clear, easy to clean, odorless, non-toxic, can be steam-sterilized. ⅛" to 1" ID. *Bul. 66.*

ACE rubber and plastic products

AMERICAN HARD RUBBER COMPANY
93 WORTH STREET • NEW YORK 13, N. Y.

DISTRIBUTION. . . .

Group. Divided into product and producer sections, it lists specific chemical products, plant locations, production capacities, and plant employments of all producers of prime chemicals in 11 Western states, three Canadian provinces, Alaska and Hawaii. Mixtures and formulations are not included, but peripheral products, such as synthetic resins, mineral raw materials, and modified fats and oils, are mentioned with respect to major producers. Price: $5. Stanford Research Institute (Stanford, Calif.).

• Lignin—14-p. booklet, "Meadol, a Lignin from Hardwood," outlines the properties and industrial applications of alkali hardwood lignin. The Mead Corp. (Dayton, O.).

• Butyl Carbitol—4-p. pamphlet describes physical and physiological properties, shipping data, and uses. Union Carbide and Carbon Corp. (New York).

• Lime Map—revised map indicates locations (in the U.S.) of high-calcium and dolomitic rotary and vertical kiln lime plants. National Lime Assn. (Washington, D.C.).

• Glycols—60-p. book describes uses and suggested applications for 12 glycols and triols. Includes tabular and graphic data on properties, etc. Union Carbide and Carbon Corp. (New York).

• Export Statistics—80-p. survey of U.S. exports to Venezuela describes that country's place in U.S. export trade, indicates the geographical sources of materials with the aid of numerous maps, lists export of services, and provides an enlarged list of companies exporting to Venezuela. Prepared by Econometric Specialists, Inc. (New York), for Creole Petroleum Corp. (New York).

•

The following publications may be obtained from the U.S. Dept. of Commerce's field offices:

• Trade Lists of Foreign Business Firms: Tanneries (Argentina); Hospitals (Austria); Plastics Manufacturers and Molders (France); Textile Industry (Republic of Ireland); Business Firms (Kuwait).

• Management Aids for Small Business—all the 1954 publications on the subject bound into one volume and classified into three groups; business-government relations, internal general management, and external sources of help and guidance. 65¢.

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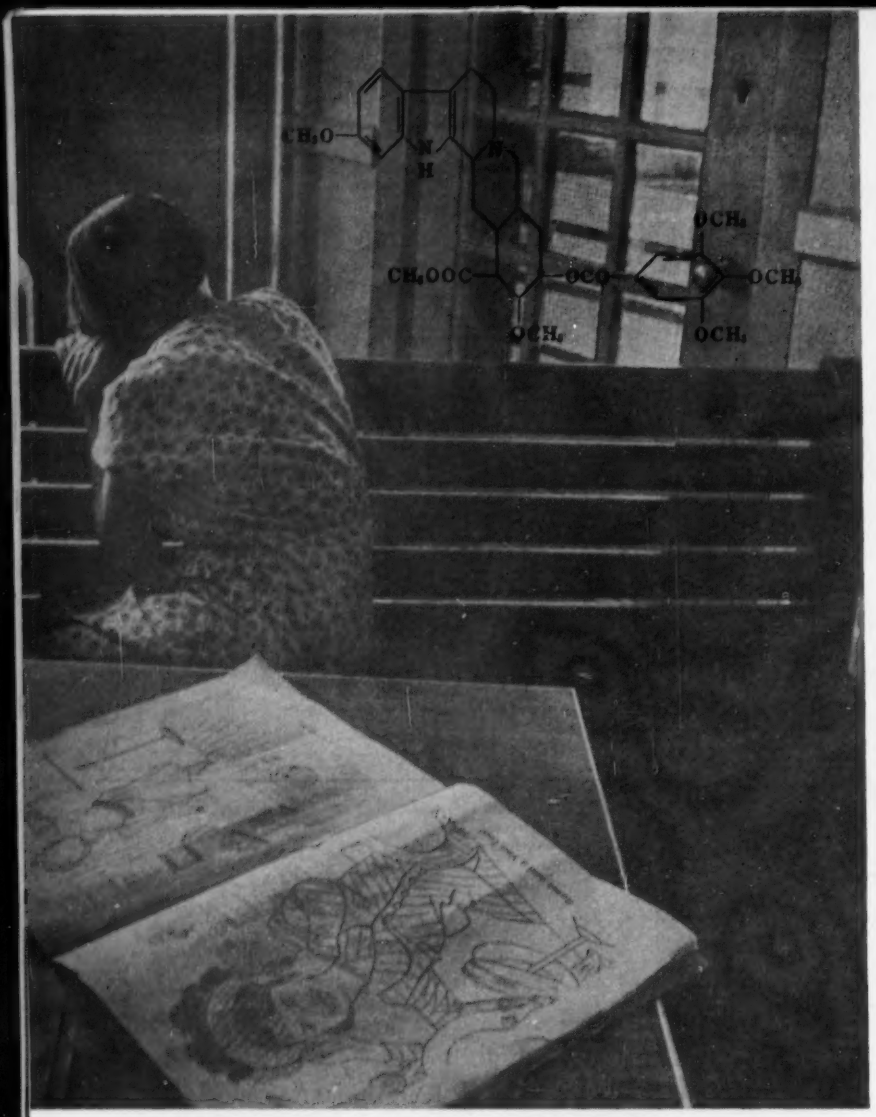

NEW DRUGS for emotional ills are providing chemical . . .

Tools for Mental Therapy

The tide of publicity for the so-called mental drugs spilled over last week in a flood of newspaper stories, magazine articles, radio programs and even a nationwide television show.* In each case, the gist was the same; two drugs—reserpine (a *Rauwolfia* alkaloid) and chlorpromazine (a synthetic)—are giving dramatic results in the treatment of emotional illness.

Tranquilizing agents, both materials reportedly possess the ability to relieve anxiety, alleviate depression and reduce the confusion of patients suffering from a variety of emotional ills.

Enthusiastic protagonists of the drugs see in them the answer to the No. 1 public health problem; to support this contention they point out that hospitalized patients receiving the drugs are easier to manage, require a shorter period of institutionalization.

Most qualified medical men, however, are more reserved, do not believe there is enough evidence to warrant clear conclusions. Critics take the position that the drugs cannot resolve the illness-causing emotional conflicts, and may forestall what they believe to be more effective treatment.

No such schism can be found among drug makers, which are now engaged in unprecedented programs of chemotherapeutic research in the area of emotional sickness.

Reserpine makers (Ciba, Pfizer, Squibb, Riker, and Penick) are looking at other *Rauwolfia* alkaloids; chlorpromazine pioneer Smith, Kline and French is also active.

Wm. S. Merrell Co. (Cincinnati), division of Vick Chemical Co., has launched full-scale clinical studies of a new synthetic—α-(4-piperidyl) benzhydrol hydrochloride—called Frenquel. In addition, studies at Galesburg State Research Hospital (Illinois) with monosodium l-glutamate have sparked hope for this compound in the treatment of aged patients suffering from mental disorders usually considered irreversible.

The most actively researched of the chemical calmers is an alkaloid mixture obtained from the *Rauwolfia* plant. This source has yielded more than thirty alkaloids*, of which six show varying degrees of potential in therapy. Because of high yield (about a thousand times greater than any of its competitive alkaloid components) and high potency, reserpine has found most widespread use.

Reserpine research is following two tacks: investigations of possible means of synthesis; and a search for sources other than *Rauwolfia serpentina*, which is grown in India.

All producers of the alkaloid are trying to develop a commercially feasible synthesis, although success does not appear to be close at hand.

On the second count, too, there is considerable activity. Chemists of Chas. Pfizer recently developed a technique for extracting the alkaloid from *Rauwolfia heterophylla*, a Central American shrub. Pfizer is now said to be producing reserpine from this source, as is S. B. Penick and Syntex, S.A.

Other *Rauwolfia* alkaloids that aspire to reserpine's role in mental therapy include Riker Laboratories' newly isolated rescinnamine (*CW, May 21, p. 84*); Sandoz, Inc. (Basle, Switzerland) has developed the reserpine-like canescine (obtained from *Rauwolfia canescens*). Another alkaloid, raunormine, believed to be identical with canescine but from an undisclosed *Rauwolfia* species, is under investigation by S. B. Penick.

And earlier this year, Ciba chemists

* Sponsored by Smith, Kline and French in cooperation with the American Medical Assn.

* Among them: ajmaline, serpentine, rauwolfine, and yohimbine. Reserpine is distinguished by its high carbon content.

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revealed that a new *Rauwolfia* alkaloid had been isolated. Labeled deserpidine, it differs from reserpine by the absence of a methoxy group.

The success of the synthetic compound chlorpromazine—called Thorazine by supplier Smith, Kline and French—has corrected the short-lived belief that only relatives of reserpine had a future in mental treatment. Chlorpromazine was discovered at the Rhone-Poulenc Specia Laboratories (France) in a search for an antihistamine free of sleep-inducing properties.

Quite the opposite type of action was obtained. Chlorpromazine induces deep sleep in laboratory animals. But its sedative action is unusual in that the sleeping subjects are easily aroused; this finding was the clue to its value in the treatment of nervous and emotional diseases.

Although chlorpromazine and reserpine currently have the field to themselves, a newcomer called Frenquel may soon be challenging them.

In preliminary trials, the drug reportedly blocked hallucinations in 60% of schizophrenic and alcoholic patients, also showed value in the treatment of postsurgical confusion states. It is a close kin to another Merrell anti-depressant (Meretran) and is said to be particularly effective in the acute, early stages of schizophrenia.

Frenquel appears to act on a different region of the brain than does reserpine and chlorpromazine. But all three have one thing in common—they cross the brain's blood barrier, main hurdle of aspiring drugs in this field.

The drug has also stirred up interest for its ability to block chemically induced hallucinations (produced by doses of lysergic acid diethylamide), may provide new insight into the chemical nature of mental imbalance.

Lack of a clearly defined link between emotional disorder and imbalances in body chemistry is the chief obstacle to the development of new drugs.

Additional hurdles are the occasional side effects encountered with the new drugs. In a small percentage of patients, chlorpromazine drops blood pressure to dangerously low levels, can cause jaundice or depletion of white blood corpuscles. Side effects of reserpine include lethargy and nasal stuffiness.

Offsetting these drawbacks are the versatility the drugs have shown in combatting a wide range of nonemotional maladies. Chlorpromazine has shown an ability to counter nausea and vomiting (in pregnancy, gastrointestinal disorders), ease withdrawal from drugs and alcohol.

Reserpine (world sales of which now total $50 million) is widely used in the treatment of hypertension, alone or in combination with other hypertensive agents.

Proponents of the drugs for mental disease point out that their low cost puts treatment within the reach of

THE CASE FOR MORE RESEARCH

1 More people are hospitalized for mental illness than for all other diseases combined; and it's estimated that approximately 1 in 5 industrial employees is suffering from a mental disorder.

2 It cost U.S. taxpayers more than $1 billion in 1954 to care for mental patients.

3 But, all told, only about $6 million/year is spent for research on more than 100 different mental disorders.

4 This amount of money is about 3% of the nation's annual outlay for all medical research; and it's less than 1% of the amount spent to keep the mentally ill in hospitals.

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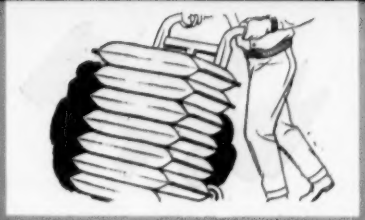

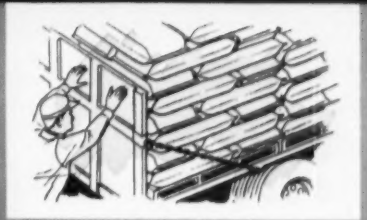

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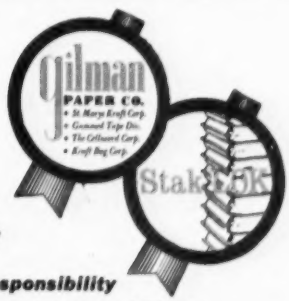

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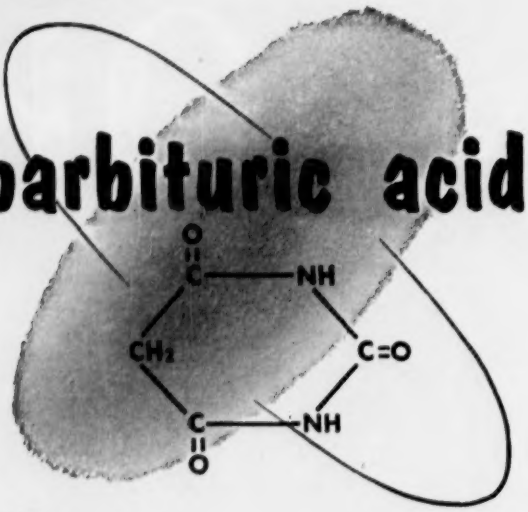


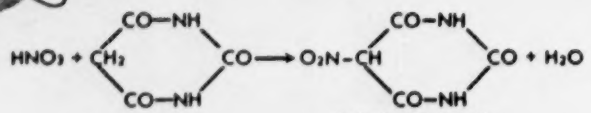
PROPERTIES

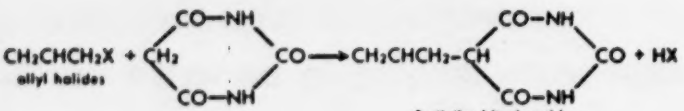
molecular weight: 128.09
melting point: decomposes at 245°C±
solubility: soluble in hot water, slightly soluble in alcohol, soluble in ether.

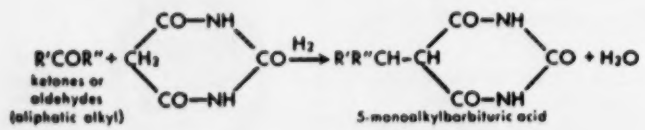
KAY-FRIES SPECIFICATIONS

color: clean white to yellow white powder
purity: 98.5% min. **chloride:** .020% max.
loss on drying: .5% max. **ash:** 1.00% max.

TYPICAL REACTIONS







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many mentally disabled people who cannot afford private psychiatry. An average maintenance dose (3 mg.) of reserpine, for example, costs 15¢/day.

The National Association for Mental Health, Inc. (New York) points out that the majority of the nation's mental patients are now given only minimal care because mental institutions are overcrowded, understaffed, and underequipped. The association also points out that taxpayers now pay more than $1 billion/year to support mental patients, who will lose about $1.75 billion in potential earnings.

Industry's stake in the problem is particularly high. The association estimates that as many as 20-25% of all industrial personnel are suffering from mental disorders ranging from psychoses to "industrial maladjustment" —a catch-all term describing such symptoms as absenteeism, accidents, dissatisfaction, alcoholism, turnover, and poor job performance.

On the Rise: Capping these statistics is the fact that emotional illness is increasing at an alarming rate. In 1934 the probability of being hospitalized for this cause was 1 in 20; today it is about 1 in 10.

Currently, nearly 750,000 people are under care in mental hospitals—more patients than the number hospitalized for all other diseases combined. And over 250,000 new mental patients are admitted each year.

The danger inherent in this situation is a strong force behind the recent publicity on the problem. And pharmaceutical firms would not look amiss on the pressure of enlightened public opinion exerted on state legislatures.

Reason: state mental hospitals, where most institutionalized mental patients are to be found, have exceedingly low budgets for drugs. A psychiatric researcher of New York's Manhattan State Hospital reveals: "Although our drug budget has recently been increased, it is still low. We must rely on the bounty of the pharmaceutical houses, insofar as a significant portion of our psychiatric drugs is concerned."

Regardless of whether additional aid is rapidly forthcoming, drug companies will continue their quest for useful new agents. Now that the door to a chemical approach has been opened, their efforts should play an increasing role in the attack on today's prime public health problem.

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STEEL'S MASS SPECTROMETER: New coke research tool, it paces an . . .

Apparatus Outbreak

As if to assert its importance in the scheme of today's research, the laboratory equipment scene erupted last week in a rash of activity.

Spectroscopy provided the pace setters.

• Into operation at U.S. Steel's Pittsburgh, Pa., applied research laboratory went what is said to be the steel industry's first mass spectrometer. Acquired primarily for the analysis of coke-oven gases, the instrument* is useful in quantitative determinations of organic mixtures.

Where complex mixtures are concerned, the mass spectrometer often is faster and more accurate than infrared and ultraviolet spectrometers. Both IR and UV are stand-bys of coke-oven chemistry.

• Fisher Scientific is readying a research project aimed at increasing the versatility of its newly acquired Todd Spectranal. Developed in 1953 by Todd Scientific's Floyd Todd, the instrument is a versatile and relatively inexpensive tool for spectroanalysis. It's used principally in analyzing drugs and metals. But Fisher—which recently purchased the patents on the instrument—believes its field of industrial application can be expanded.

Also from Fisher is a combination heater-agitator for evaporating liquids and dissolving substances of all sorts. An oscillating hot plate, the device sells for $270 (115-volt) or $300 (230-volt.)

• Four items of apparatus are in the final stages of development at The Emil Greiner Co. (New York); ultramicro thermoregulator for high-precision temperature control; cartesian manostat equipped with a calibrated scale that is said to allow extremely precise pressure readings; glass and Teflon needle valve to replace stopcocks; and taper-joint clamp that does the work of conventional hooks and springs used for the same purpose.

• And companies that are short of cash now can buy laboratory equipment on the installment plan. Taking a page from the home-furnishings business, Chicago Apparatus launched a finance plan "as a means of enabling small and medium-size businesses to meet competitors' quality . . . controls and engage in research."

Under the plan, a company could buy lab supplies or even outfit an entire laboratory and take from three to five years to pay. Chicago Apparatus reports that most such laboratories can be set up for $3,000-10,000. And it will supply to prospective laboratory purchasers free counsel on the personnel and equipment required by the proposed facility.

* How it works: mass spectrometers bombard samples with a stream of electrons, break the materials down into ionized molecular fragments of different masses. Each compound has a unique way of breaking up; the instrument identifies substances by counting the number of fragments of each mass produced. Voltage needed to neutralize the charged fragments provides a quantitative measure.

Moth Foiler

Staffers of Australia's Commonwealth Scientific and Industrial Organization (Geelong) recently uncovered a hidden talent of dieldrin. It is, according to their findings, a very promising agent for imparting permanent insect resistance to wool.

As little as 0.05% (by weight of wool) of the insecticide is said to give moth protection that persists through 1½ hours of laundering and one hour of dry cleaning. And preliminary experiments indicate that it is also effective against carpet beetles.

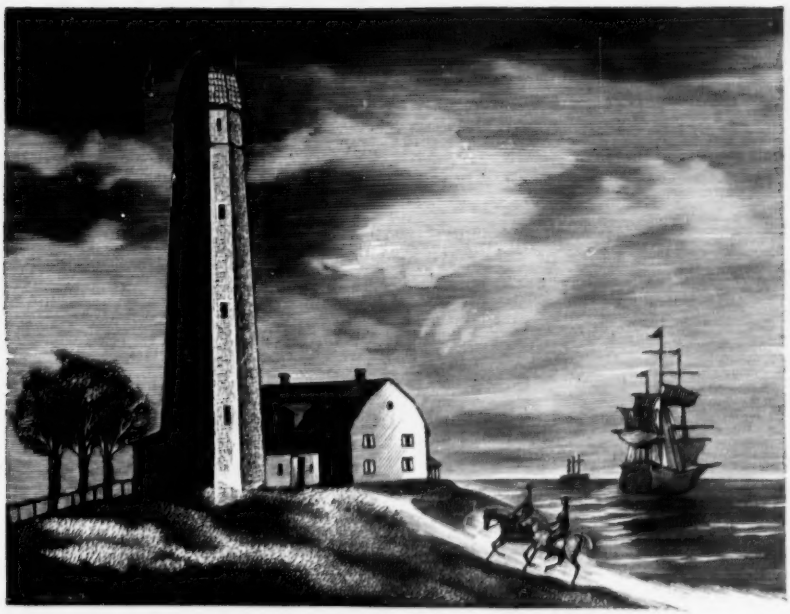
Permanent mothproofers for wool are not unknown. Commercially available chlorinated aromatic sulfonic acids, for example, give satisfactory results, are applicable to the fiber from the dye bath. But the quantities required—at least 1% of the wool—are too costly for widespread use.

Relatively inexpensive agents—e.g., DDT, silicofluorides and benzene hexachloride—are not fast to repeated washings and dry cleaning.

To test the affinity of dieldrin for wool, the Australian researchers treated worsted fabric with petroleum ether solutions of the insecticide. After removal of the solvent (by evaporation), fabric samples were laundered in a wash wheel using 0.2% soap solution at 45 C. To ascertain the effect of dry cleaning, samples were rotated in 120 ml. of petroleum ether for the required time.

Each of the washed and dry-cleaned samples was exposed to ten clothes-moth (*Tineola bisselliella*) larvae for a period of two weeks. Ob-

FAMOUS LIGHTHOUSES OF AMERICA



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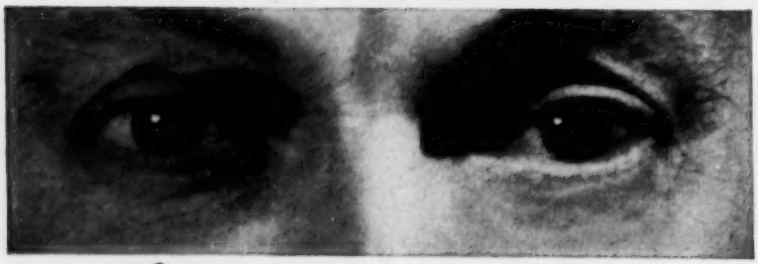

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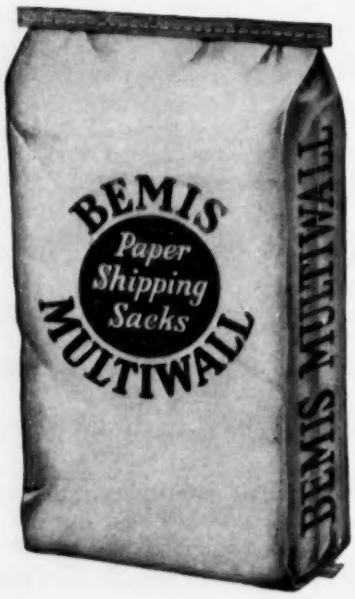

served mortality of larvae, coupled with loss of fabric weight, was taken as a measure of moth resistance.

Still Abuilding

These new facilities underscore the continuing upswing in research construction:

- Last week, United States Rubber Co. broke ground for its new $4-million research center on a 90-acre site in Preakness, Wayne Township, N.J. The campus-like facility will consist of three brick buildings totaling 134,000 sq. ft. in area, consolidate basic research for the firm's divisions.
- Harlan Associates (San Francisco) has opened a $30,000 paint research laboratory in Los Angeles.
- At Chicago, meanwhile, ground has been broken for the central paint research laboratory of Sears, Roebuck & Co. The 20,000-sq.-ft., single-story brick structure will house research and development studies for Sears' seven paint, varnish and wallpaper factories, is scheduled for completion late this fall.
- All chemical product research of Ethyl Corp. is slated to be consolidated in the firm's $450,000 laboratory under construction at Baton Rouge, La. The second major expansion of Ethyl's Baton Rouge laboratory facilities in five years, the new building will provide 18,000 sq. ft. of space for 60 laboratory and office workers.
- Owens-Corning Fiberglas Corp. (Toledo, O.) has just revealed plans to build a research center for fundamental studies only, on its recently acquired 154-acre property near Granville, O.
- According to Midwest Research Institute (Kansas City, Mo.), its three-story, 80,000-sq. ft. laboratory building cost approximately $15/sq. ft. to build, compared with $35-40/sq. ft. for other laboratories. Some expense-saving features: concrete floors; minimum use of plaster: doors only where essential. As an added economy measure, much of the building's furniture was built by the institute's machine and wood-working shops.

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Available: The new (15th) edition of Consulting Services, published by the Assn. of Consulting Chemists and Chemical Engineers, is now available. A directory of the organization's membership, the book details qualifications,

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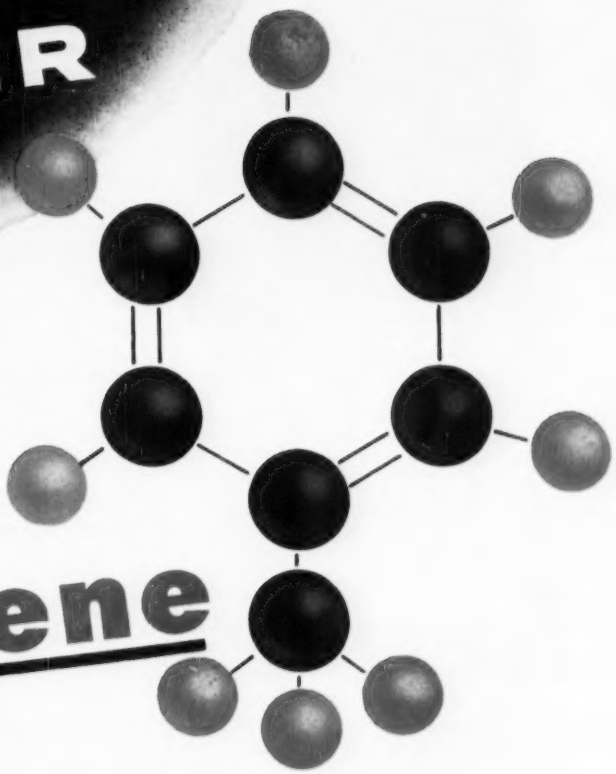

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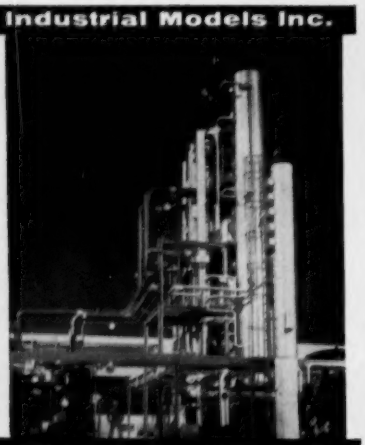

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activities, addresses of individual consultants. Cost: $1/copy.

•

Hotbox Helper: Oleic acid derivatives are spotlighted by Armour Research Foundation as likely new additives for oils used in journal bearings of railroad freight cars. ARF's interest in lube oil additives stems from an investigation—sponsored by the Assn. of American Railroads—of ways to reduce the occurrence of freight car hotboxes. Researchers found that excessive thinning of hot oils plays an important part in causing hotboxes. Derivatives of fatty acids, especially oleic, are cited as part of a suggested multistep solution to the problem.

•

Private "Pig": A five-ton, lead-shielded "pig" will soon be playing a role in radioactivity studies at B. F. Goodrich's Brecksville, Ohio, research center. Loaded with slabs of cobalt-60 (supplied by Brookhaven National Laboratory), the device will serve as a source of high-energy radiation for chemical process studies. Its five hollow chambers will accommodate materials to be irradiated. The "pig" is said to be the first of its kind to be used outside a government laboratory.

•

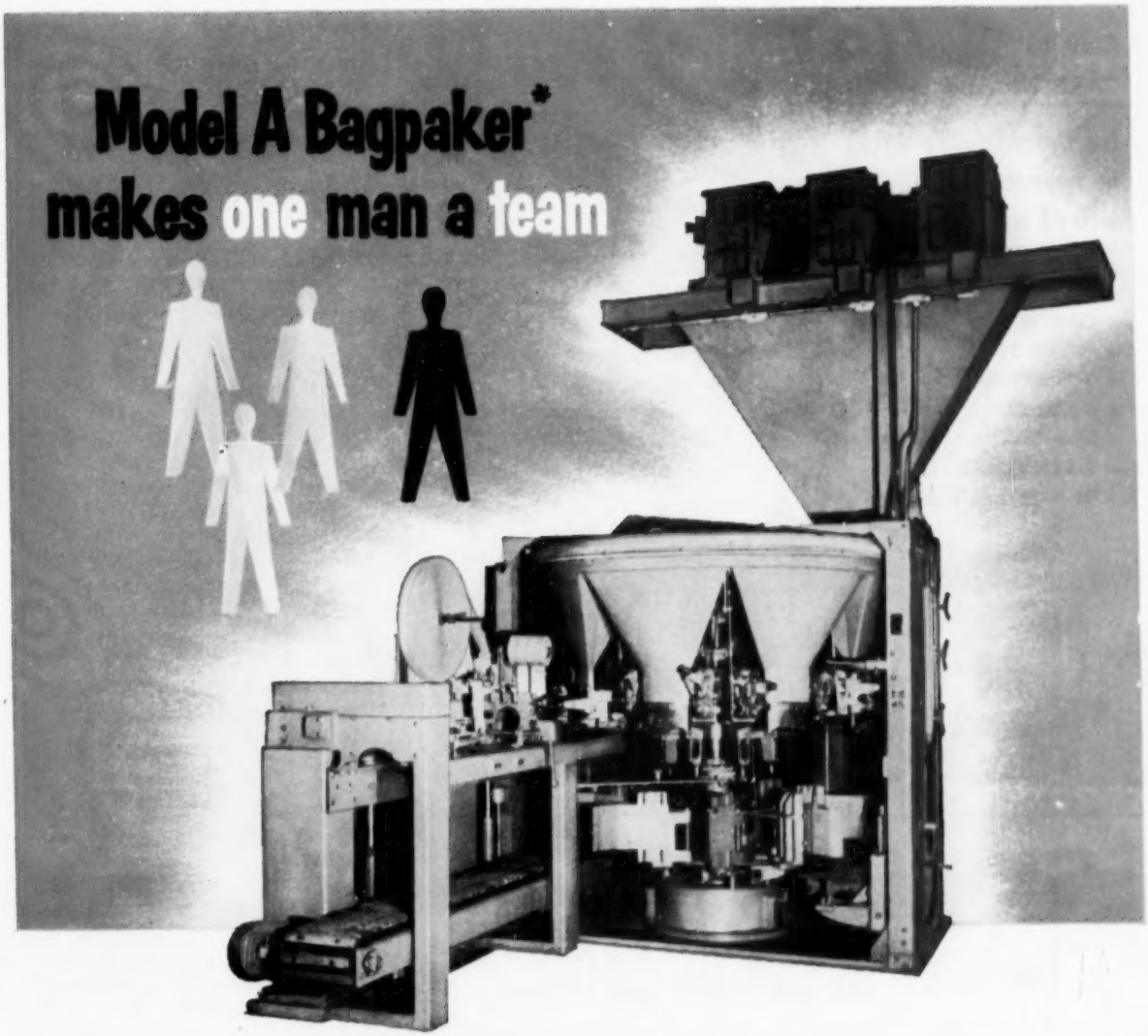
By Any Other Name: Oxamycin, an antibiotic isolated by Merck researchers from Guatamalan soil samples, was reported last week to be identical with Commercial Solvents' cycloserine. Clinical tests with the substance (*CW, Feb. 26, p. 66*) have demonstrated the drug's ability to combat tuberculosis and genito-urinary infections, but there's no guarantee that it will prove therapeutically valuable. Still unan-

Wanted: Chemicals to Screen

RAPID SCREENING of fungicides is provided by a new technique, a development of James Kendrick, Jr., and fellow University of California plant pathologist, George Zentmyer, who are here examining a culture container. The pair are screening chemicals at the rate of 30 compounds a week, against the ten most important California soil fungi.

And they're hopeful they'll be able to boost the rate soon. The rapid-screening procedure is a simple three-step affair that can be carried out in simple lab apparatus. Chemical makers are supplying candidates for evaluation.

Model A Bagpaker* makes one man a team



The Model A Bagpaker® makes large tonnage bagging of free flowing materials a one man operation—and up to 350 tons can be bagged per 8 hour shift without overtime.

All the operator does is hang the empty bags on the filling spouts. Accurate weighing, filling, settling and sewing are fully automatic.

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RESEARCH . . . . . .

swered are questions concerning the ability of bacteria to become resistant to the agent; research on this score is now in progress. Regardless of what it is called, the antibiotic, structurally, is D-4-amino-3-isoxazolidone. A synthesis is known.

•

Polymerization Aid: New work at Japan's Osaka City University has turned up a number of dye-induced photopolymerizations of potential commercial interest. Researchers M. Koizumi, A. Watanabe and Z. Kuroda investigated combinations of styrene and various cyanine dyes, theorized that resultant polymerization was promoted by direct action of the dye molecules on the monomer.

Sample reaction: a mixture of styrene and *n*-butanol containing about 6×10^{-4} mole/liter of pinacyanol iodide, irradiated by visible light (at 60 C in a vacuum), polymerized rapidly accompanied by decomposition of the dye molecules. Presence of the dye did not affect the rate of thermal polymerization.

Analagous reactions were found using other cyanine dyestuffs such as isocyanine, kryptocyanine, heptamethinthiocyanine, and pinacyanol chloride.

•

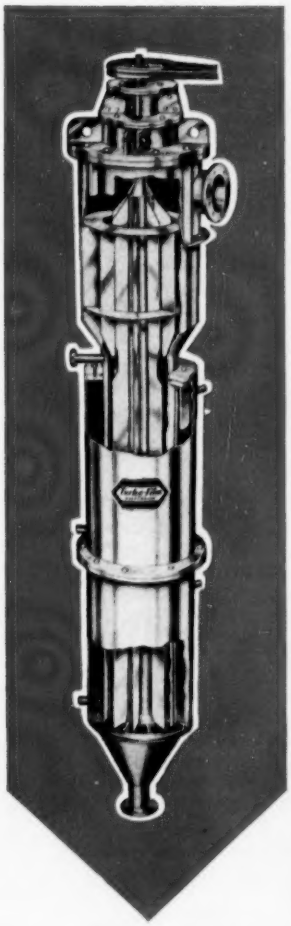
Modern Mercury: Advanced refinement techniques are reportedly the key to an oxidation-free, low-meniscus mercury recently developed by Metalsalts Corp. (Hawthorne, N.J.). It is expected to find use in precision instruments, computers, and automation devices.

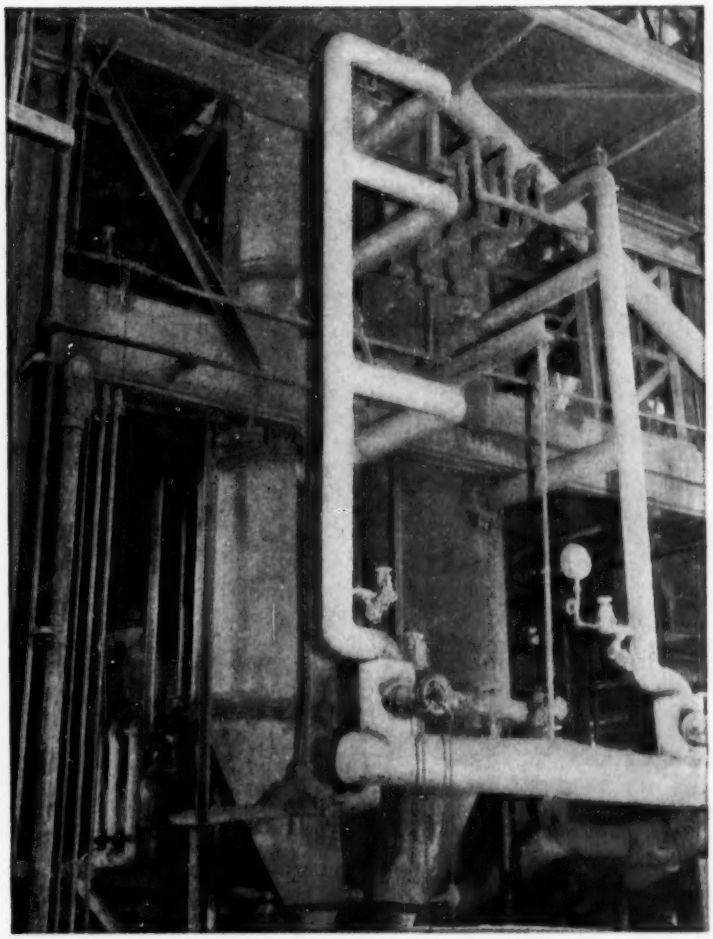
•

Fluorine Finds: A new government publication, "Chemical Investigations of Fluorine Compounds as Fungicides," reports that cotton thread treated with 1,000 ppm. solution of the biphenyl sulfide of 2,2'-dihydroxy-5,5-difluorobiphenyl showed neither discoloration nor loss of strength and was completely protected against test fungi. Also described: synthesis and properties of 15 aromatic fluorine compounds prepared for fungicidal screening. The document (PB 111592) is available from the U.S. Dept. of Commerce, Office of Technical Services. Price: $1.

•

Polymer Radiation: Another new OTS publication (PB 111529, 50¢) surveys the effect of irradiating polymers on their physical properties (e.g., oil and heat resistance and aging).





At left—two of four No. 5 Turba-Film Evaporators at Allied Chemical & Dye's South Point, Ohio, works.

Abrasive fertilizer slurry is rough test of TURBA-FILM® EVAPORATORS

Four Rodney Hunt No. 5 Turba-Film Evaporators working under the most difficult conditions are used in the production of Arcadian 12-12-12, a new and highly efficient chemical fertilizer manufactured by Allied Chemical & Dye Corporation.

The fertilizer is made at Allied's South Point, Ohio, plant. The various chemical ingredients are mixed to form a slurry which must then be reduced to uniform granules of low moisture content. Turba-Film evaporators were found capable of reducing moisture content from approximately 20% to 6% at high production rates.

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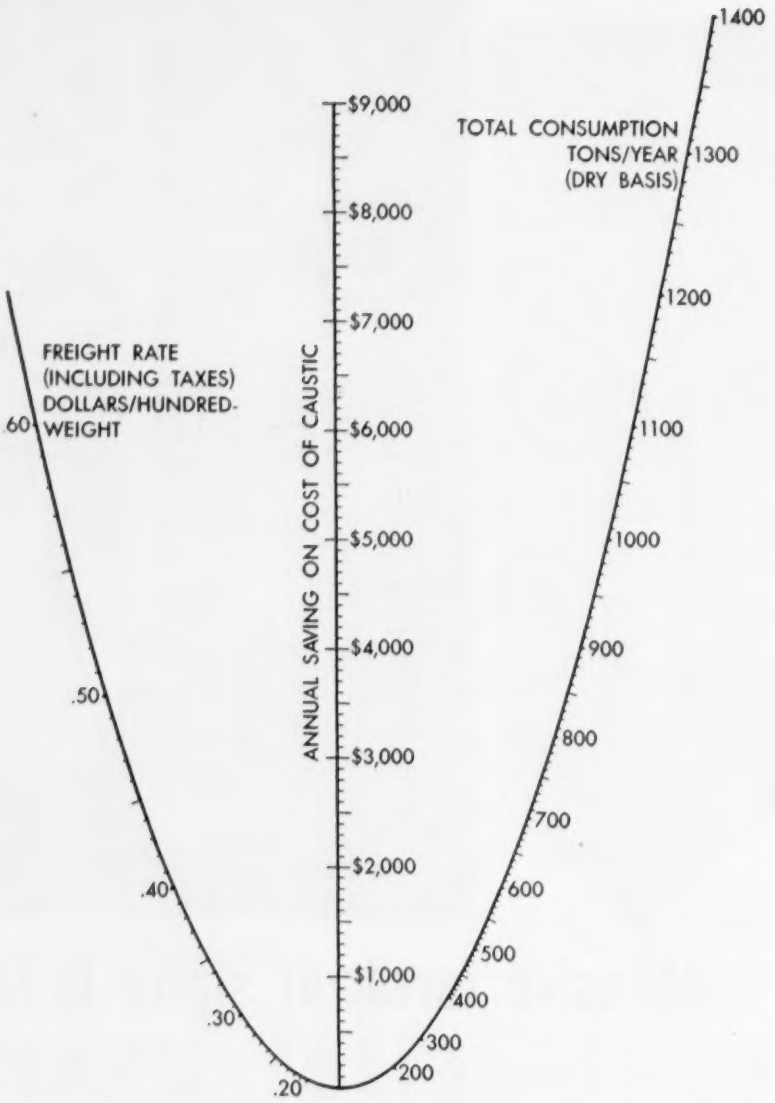

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For quick service, write or phone the nearest Hooker office.

"CAUSTIC SODA BUYER'S GUIDE" is the title of a new pocket-size booklet we'll be glad to send you free. Contains helpful facts on the economics of 50% and 73% solutions; other forms of caustic soda; capacities of tank cars and other containers; useful shipping information. Write us for a copy.

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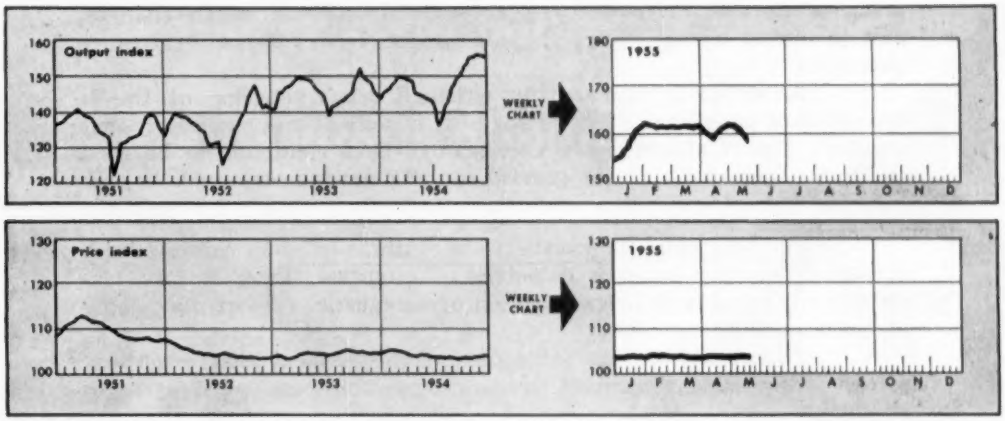
MARKETS . . . . . .



WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
CHEMICAL WEEK Output Index (1947-49=100)	163.9	162.7	144.9
CHEMICAL WEEK Wholesale Price Index (1947=100)	104.3	104.2	104.3
Stock Price Index of 11 Chemical Companies (Standard & Poor's Corp.)	407.1	414.2	296.7

MONTHLY INDICATORS—Trade (Million Dollars)	Manufacturers' Sales: Latest Month	Manufacturers' Sales: Preceding Month	Manufacturers' Sales: Year Ago	Manufacturers' Inventories: Latest Month	Manufacturers' Inventories: Preceding Month	Manufacturers' Inventories: Year Ago
All Manufacturing	$25,980	$24,694	$23,637	$43,305	$43,256	$44,995
Chemicals and allied products	1,891	1,787	1,618	3,020	3,019	2,952
Petroleum and coal products	2,388	2,307	2,188	2,688	2,670	2,723

MARKET LETTER

Unsettled. That's the word for the potash picture today. The new fertilizer season starts next week (runs from June 1 to May 31, '56), but not all sellers have yet posted prices to cover future sales. At least one major producer, though—United States Potash—has announced potash salts schedules for the upcoming period.

Significantly, a special port price on high-grade muriate potash, established last year to buck foreign competition, is eliminated. This, in effect, will hike tags some $2.10/ton for material at the ports. Question in the trade now is whether or not the special quote will be generally dropped in the new season.

•

Demand for potash salts in agricultural uses has been zipping along well ahead of last year's pace. Fact is, deliveries set a new quarterly record during the first three months of this year. Trade movement lost steam last month, however, and by this week some observers report it has skittered to a near-halt.

Despite passing of the peak seasonal-order surge, most producers still have hopes of picking up a good amount of business deferred by this spring's late planting start.

•

Good weather has nudged sales of most major paint materials. Lead pigments, zinc oxides, dry colors, all are moving along quite well. On the other hand, too much supply, not enough demand is affecting anti-

mony oxide prices. Prices this week are scaled down by 2¢/lb. The changes, first in almost a year, lower the c.l. tag to 27¢/lb.; 28½¢ for smaller quantities.

All antimony oxide outlets, although, aren't petering out. Use in fire-resistant plastics and fabrics has been widening—not explosively, but steadily. Fire-retardant paint makers, too, have continued to be good customers compared with the general run of paint-industry oxide buyers.

•

Overseas calls for caustic soda continue quiet in contrast with present heartening domestic industrial consumption. Price of f.a.s. material is still listed at $2.75/cwt., but European caustic is reportedly moving at lower quotations.

There's no obvious indication at the moment that exporters' prices will tumble, but most traders agree business could stand a stimulant.

•

Foreign Operations Administration programs continue to add a welcome fillip to the pesticides market. Bids are being opened in Washington this week, on a relatively large procurement for material destined for Korean delivery by June 15. (The distressed-labor clause, which brought out some industry complaints recently [*CW, March 26, p. 92*], is conspicuously missing from the current requests.)

Here's the rundown on the General Services Administration order, with all bids on a f.a.s. basis:

- DDT, 100%, 67,200 lbs.; 75%, 224,000 lbs.
- BHC (12% gamma isomer), 448,000 lbs.
- Nicotine sulfate, 112,000 lbs.
- Blue vitriol, 448,000 lbs.
- Ethyl *p*-nitrophenyl-thionobenzenephosphonate (EPN) 67,200 lbs.
- Derris root (4% rotenone), 67,200 lbs.
- Small amounts (about 4,000 lbs.) of 0.5% warfarin, Ceresan, Arasan.

•

Pickup in use for chlorinated insecticides is contributing to chlorine's delicate supply/demand balancing. In some sections of the country, these calls, plus demands from the pulp and paper industry, and water and sewage treatment outlets, have chlorine tilting toward the tight side. Paradoxically, in a few areas where consuming plants are sparse, supply is slightly long.

Conditions on the whole are such, though, that marketers are reluctant to speculate on the possibility of a price change—either up or down—in the immediate future. The absence of such talk is unusual in the chlorine arena.

SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending May 23, 1955

	Change	New Price		Change	New Price
UP					
Menthol, natural USP, Brazilian	$ .15	$9.00	Silver cyanide, fiber drums, 2,500-oz. lots, per oz.	.01	.8075
DOWN					
Antimony oxide, bags, c.l., frt. alld.	$ .02	$ .27	Ionone methyl, standard, cans, drums	.40	5.70
Ionone, alpha, cans	.80	5.70	Mercury, metal, 76-lb. flask, per net flask	6.00	302.00

All prices per pound unless quantity is stated.

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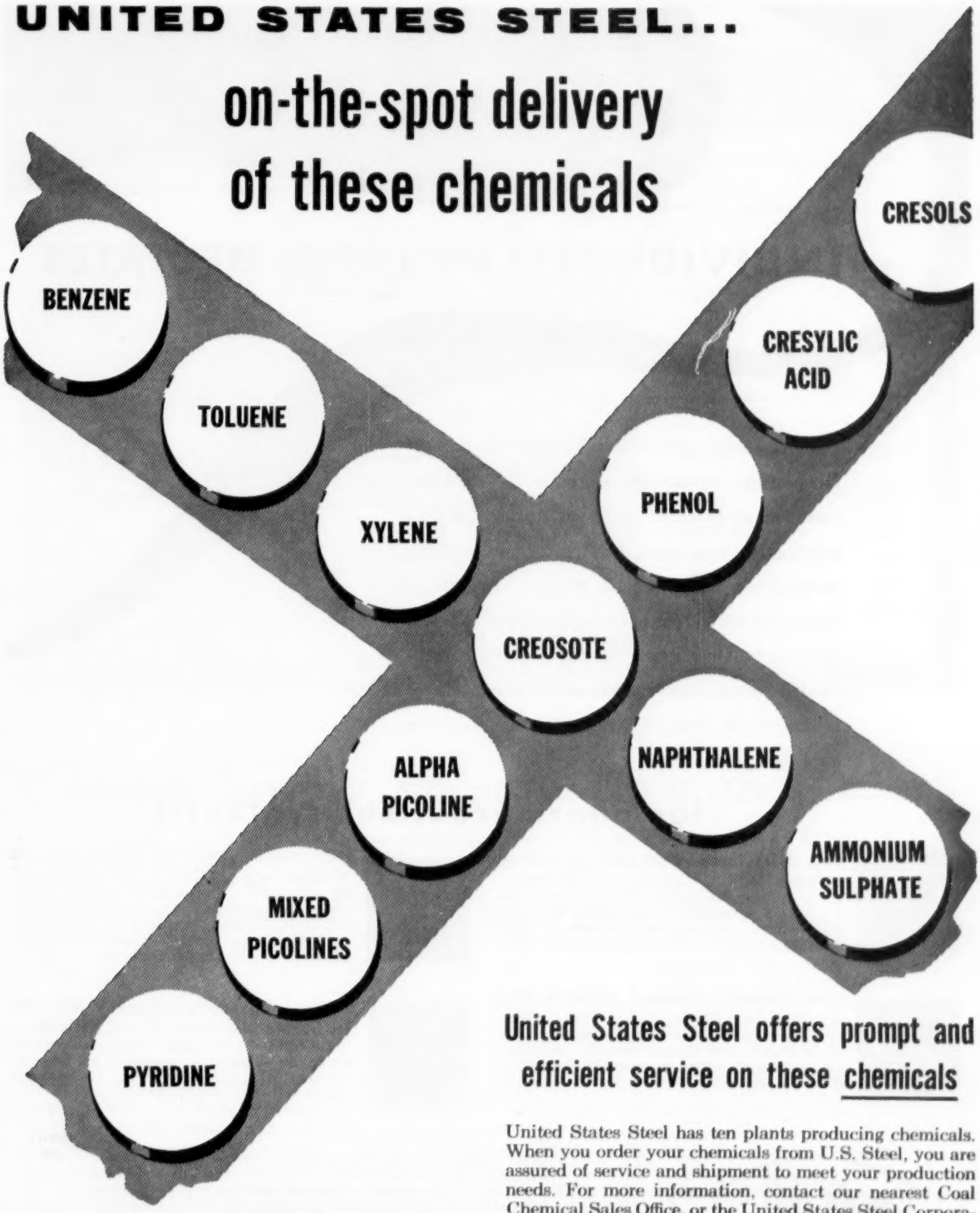

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A NEW MOTION PICTURE, "The Waiting Harvest," tells the complete story of the participation of U.S. Steel in the field of chemicals. It is available on request in 16 or 35 mm film from Film Distribution Center, United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pa.

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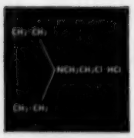

beta-Diethylaminoethyl Chloride Hydrochloride. (DEC). $(CH_3CH_2)_2\ NCH_2CH_2Cl.\ HCl$. A granular solid. Specially suited for use as an intermediate in organic chemical manufacture, including the production of antispasmodic agents and other pharmaceuticals.

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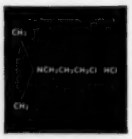
beta Dimethylaminoisopropyl Chloride Hydrochloride. $(CH_3)_2\ NCH_2CHClCH_3.\ HCl$. (DMIC). An organic intermediate similar in appearance and properties to DEC and DMC. Specially prepared for manufacture of analgesics and other pharmaceuticals. Other potential uses in organic synthesis.



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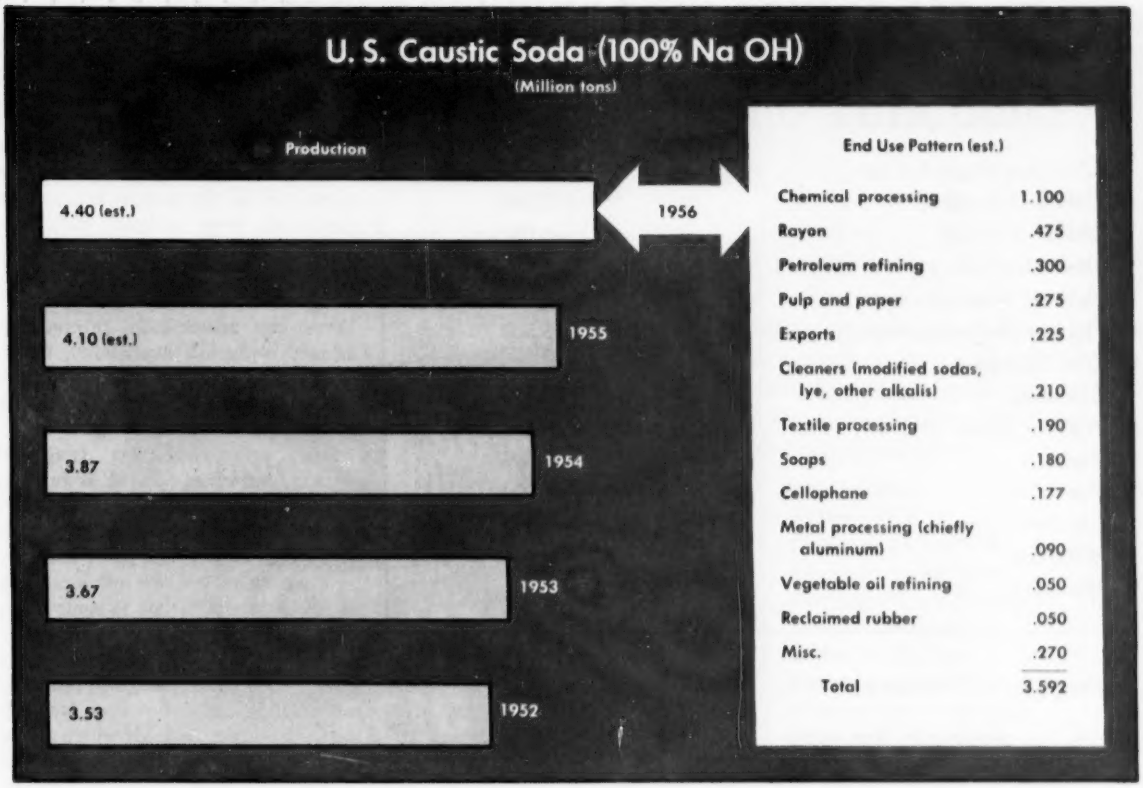


Caustic Supply: Enough, Now and Later

Caustic soda production, now more than 4 million tons/year — and still less than full capacity — poses a recurring problem: What to do with the excess?

On the other hand, consumption is due for a hike—though minor—in major outlets (chemical processing, rayon, textiles).

A long-range curve of caustic soda supply on any chart would feature a decided hill-and-dale aspect. Peaks of plenty have alternated with valleys of shortages. Nub of the variations, of course, is the fact that bulk of the caustic produced is by-product, with chlorine, in the electrolysis of salt brine. And chlorine demand, in recent years, has far outstripped that for caustic. Hence, need for chlorine has at times brought on virtual floods of caustic. Today, broadly speaking, caustic is long.

A still more precise description of the current—and future—caustic soda situation is this: not quite on an even keel; some slight additional demand in the offing; prices in many areas, generally, not too inflexible; and ample reserve producing capacity.

At the moment caustic capacity in the U. S. is admittedly top heavy, and there are indications that the surplus over demand will continue to be worrisome. Reason: the past expansion in chlorine producing facilities, and that slated to come in within the next year or two. These new plants, captive for the most part, will turn out electrolytic chlorine and worsen the caustic overcapacity.

That caustic soda production is seldom a critical problem for long is pointed up by the fact that the Office of Defense Mobilization did not deem it necessary to establish a separate expansion goal, even in the hectic days of the Korean emergency. Enough, said ODM, was in sight with the expected swelling in chlorine potential.

By-product Bunch-up: Since 1950, according to a recent Commerce Dept. rundown, the chlorine industry increased capacity in this country about 56%, to tick off an estimated current production rate of some 2.87 million tons/year or about 80% of last year's full capacity.

The expansion, though already oversubscribing (105%) the ODM goal, with the entry of Weyerheuser Timber and other customers-turned-producers, will continue. Hence, these increases (plus enlargement of some lime-soda plants since Korea) will shove total U.S. caustic-soda capacity by next year to a level at least 40-45% higher than that existing a short five years ago.

Caustic output, both by the electrolytic and lime-soda processes, racked up an all-time high in '54—nearly 3.87 million tons, or about 113,000 tons

Major U.S. Caustic Soda Producers

	Est. Capacity (tons/year)
Champion Paper & Fiber	36,500
Columbia-Southern	515,000
Diamond Alkali	365,000
Dow Chemical	1,100,000
Frontier Chemical	36,000
Hooker Electrochemical	255,500
Olin Mathieson	185,000
Monsanto	75,000
Niagara Alkali	40,000
Pennsalt	185,000
Solvay	165,000
Stauffer	100,000
Westvaco	150,000
Wyandotte	220,000

greater than that during rip-roaring '51.

Note this changing pattern of production, though. Three years ago, the electrolytic process turned out some 2.52 million tons, while lime soda accounted for 507,500 tons; in '53 the former had inched up to 2.76 million, the latter had slipped to 504,000; and last year, lime soda caustic amounted to a mere 478,600 and the electrolytic total surpassed 2.9 million tons.

There are many trade followers who believe that the lime-soda method of producing caustic will be obsolete within the next two or three years, but a few stoutly maintain that this is not true. Fact is, the obsolescence prediction has been making the rounds for a number of years, but like a not-quite-dry well, it continues to pour hefty quantities into the nation's caustic pot.

Where to channel the ofttimes overpowering flood of caustic soda has been a stickler to marketers. Years ago it was a common enough practice to dump excess material into streams or haul it out to sea. Antipollution hullabaloos have since all but eliminated this convenient outlet.

Emphasis has been laid more and more on research and sales promotion to expand the caustic market, and by and large, growth of caustic demand has—and will continue to—depend on greater diversification, new uses, as well as on the normal expansion of established consumers.

Growth—Diverse But No Boom: Today, caustic, rated tonnagewise as one of the leading heavy chemicals, is riding the rocket of a soaring chemical-industry growth. Consumption in a myriad of chemical manufacturing processes will notch past the million-ton mark in '56, edge proportionally higher along with industry's growth.

Use, too, has of late been increasing due to the greater activity in the resurging rayon industry. (For example, rayon shipments during the first four months of '55 totaled nearly 441.5 million lbs.—some 28% higher than the comparable period a year ago.)

Whether or not rayon production—particularly high-tenacity cord for tires—continues at today's rapid clip into next year is still a moot question, but business is not likely to slip into the doldrums of three or four years ago.

The same, of course, holds true for the textile trade in general. Chances are that the level of textile production will siphon off perhaps as much as 190-200,000 tons/year of sodium hydroxide.

Cellophane, a relatively new big-time user, will probably step up to the caustic trough next year for larger amounts than ever. If current expansion plans materialize, U. S. producers will be able to turn out almost 380 million lbs./year by then—a maw for some 177 thousand tons of caustic.

But caustic soda's hold on many important outlets will be challenged in the future as it has been in the past. A husky contender, for one, is soda ash; and a complication is that a portion of the country's caustic is produced from sodium carbonate, while some caustic is converted into ash.

This conversion to some extent relieves the caustic-soda surplus but adds to soda ash availability, which in turn has kept the latter at a more favorable price level compared with caustic's.

Soda ash production from all sources, including natural, is running slightly under 5 million tons/year—considerably less than the near-6.5-million-ton capacity in place today.

Much soda ash filters into a number of noncaustic uses, but in some areas (e.g., pulp and paper, metals processing, soap) ash tonnage consumed is greater than caustic, and will probably remain so. Caustic, however, is showing some strides in fields where ash is predominant. One: in refining bauxite to make alumina for the aluminum industry. Here either alkali can be used with the nod going usually to the product with the lower delivered tag. Some observers expect caustic soon to slice out 15-18% of the aluminum processing pie.

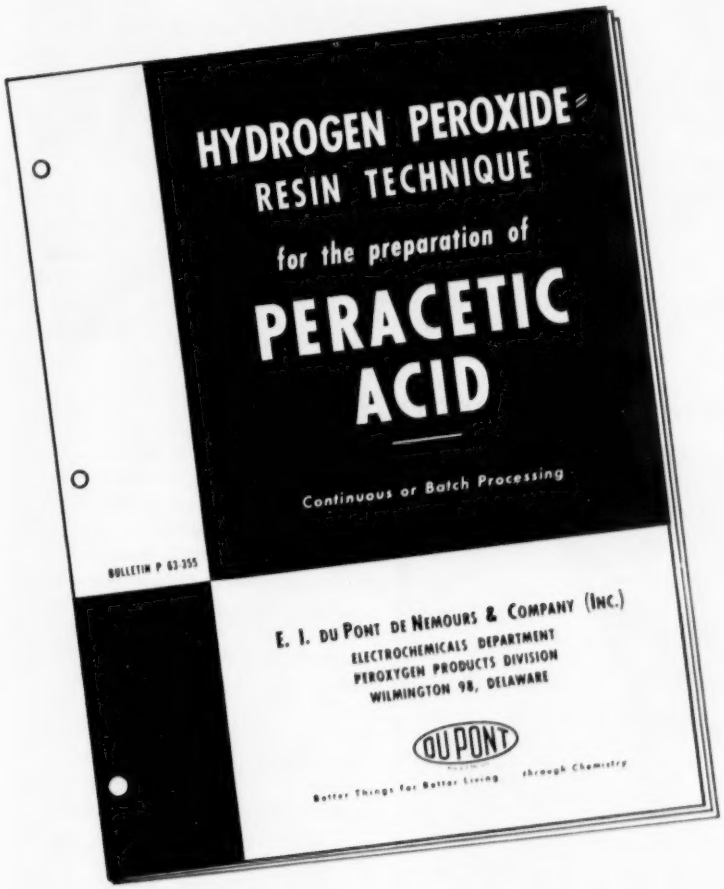
Too Much, Too Much: In view of the expected excess caustic—perhaps as much as 800-900,000 tons by '56—the increases in consumption, heartening in themselves, are comparatively slight in relation to the over-all situation.

Add too, the outlets likely to suffer, like exports. Caustic sent overseas in '54 totaled about 244,000 tons, a big step-up over the previous year's 132,000. Next year these shipments may fall short of '54's, wind up at probably no more than 225,000 tons. Reason: increase in caustic soda production abroad (in Brazil, Israel, Japan, France, etc.) will hone the razor of competition.

Thus, with more than sufficient stocks of caustic on hand, with new capacity coming in, with intensifying clashes for customers, and with, at best, a modest increase in demand in sight, caustic soda sellers will—for this year and next at least—continue to wrestle with the problem: What to do with the surplus?

Here's new convenience and safety for using hydrogen peroxide in organic reactions

DU PONT BULLETIN DESCRIBES EFFICIENT HYDROGEN PEROXIDE-RESIN TECHNIQUE



Peracetic acid can now be formed simply by passing a mixture of hydrogen peroxide and acetic acid through a cation exchange resin bed. Here are a few of the possible uses for this new Du Pont development:

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Press for Plastic Market

Opportunistic is the switch from car to boat making to utilize some expensive equipment, as well as retain likely hefty outlets for polyester resins, filler materials, catalysts and white pigment (titanium dioxide).

The turnabout came about when orders for the expected volume of plastic auto bodies—Chevrolet Corvette (*CW, June 19, '54, p. 95*)—failed to materialize last fall, and Molded Fiberglass (Ashtabula, Ohio) President Robert Morrison hit on 14-ft. plastic boat hulls as a suitable and profitable substitute.

The company, using the same 600-ton hydraulic press that stamped out Corvette underbodies, plus a pair of matched metal dies weighing 60,000 lbs. and costing $75,000 (*see cut above*), can now turn out a complete hull every 20 minutes. Goal, slated to be reached soon: 5,000 units/year.

The hull weighs some 150 lbs. as it comes off the press (*see cut*), perhaps 20 or 30 lbs. lighter than a conventional wood hull of the same dimensions. About 115 lbs. of resinous mixture is used per hull. The breakdown: 57% polyester resin, 38% filler, 4½% pigment.

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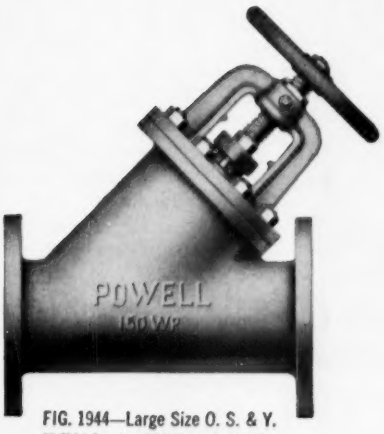

FIG. 1944—Large Size O. S. & Y. "Y" Valve for 150 Pounds W. P.

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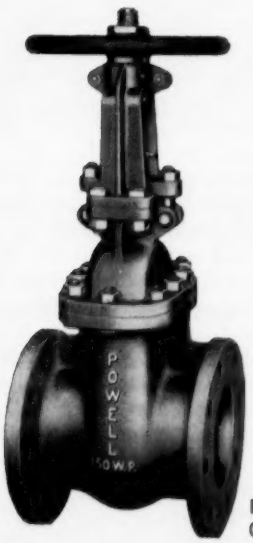

FIG. 2453G—Stainless Steel O. S. & Y. Gate Valve for 150 Pounds W. P.

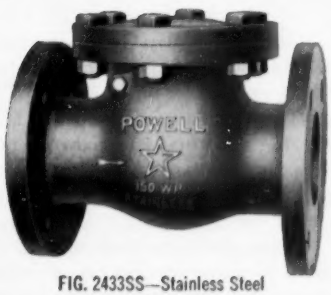

FIG. 2433SS—Stainless Steel Bolted Cap Swing Check Valve for 150 Pounds W. P.

FIG. 1891—Flanged End Liquid Level Gauge. Offset pattern.

POWELL VALVES

MICHIGAN'S COCHRANE: Speaks for chemotherapeutants in polio control.

Backed up with Figures

If you like surveys and figures, the Chemical Specialties Manufacturers' Assn. meeting in Chicago last week was your meat. For the 41st annual midyear gathering at the Drake Hotel, CSMA completed three major product studies—and all provided encouraging news.

• The insecticide division tabulated liquid insecticide sales of nearly 10.5 million gal. in '54. This is a hike of 12% over '53's production. Space sprays climbed up to 7,234,861 gal.—a 29% increase. Livestock powders, pastes, and baits, however, fell off about 35%.

• 8.5 million gal. of brake fluid were made in 1954. Over 50% of the fluid met the SAE's top (heavy-duty) standards, and the CSMA's automotive division was especially pleased that only 12% of last year's production was of substandard (not meeting SAE specifications) fluid. This survey, the first successful one after three tries, was participated in by an estimated 90% of the industry.

• Aerosol sales in '54 jumped to 185 million units (*see chart, p. 92, and CW Market Letter, May 21*). The new record is a third above last year's total—a substantial rise in view of the slight decline in sales of insecticides, the top-selling product.

New to Look at: A number of firms took the opportunity to show off new items, suggest new applications of their products to the crowd of attendants.

• Corn Products Refining Co. offered formulations for floor polish making use of its prolamine corn derivative, zein. Recipes for zein in combination with carnauba, and in no-wax polishes, were suggested. Corn Products says scuff-resistance is the outstanding property of zein polishes. In introducing the protein compound for polishes now, one major problem has to be faced: The long-time-favorite polish wax, carnauba, is at a 15-year low of 65¢/lb.

• Three new insect repellents were described by Phillips Petroleum Co.'s Lyle Goodhue. The repellents, tagged R-326, R-440, and R-11, are not yet in production, but are claimed to be the equal of any products now marketed. R-326 has demonstrated good housefly repellency; R-11 and R-440 show up at their best against stable flies. All are said to be easily synergized for improved effectiveness. The new products represent a new area of work for the oil firm.

• Aerosolers, still uncovering new applications of glass containers, had some new metal cans to look at. American Can Co. is introducing a "giant pint," a 17-oz. container, and Continental is now selling its 14-oz. can to half a dozen firms. The big sizes are figured to go well with products like insecticides and with aerosols for commercial or industrial use. For consumer products, the deal seems to be to sell these larger units for about the same price as 12-oz. sprayers.

Crown, although it doesn't plan to market an extra-size Spra-tainer because of tooling and manufacturing costs, admits to considering a beer-can-type unit.

Plenty to Talk To: Close to 725 individuals attended the Chicago meeting—a substantial increase over last year's Cincinnati gathering of 650, and indicative of CSMA's continued growth. Also revealing the increasing size of the group was the revised scheduling of meetings: although technical sessions were put into the usual two-day (Monday and Tuesday) period, committee meetings and the board of governors' meeting preceded the technical sessions by a day, and were continued the day after.

Of considerable general interest was a paper given before the disinfectants and sanitizers division. It was the address of Dr. Kenneth Cochrane, from the University of Michigan's School of Public Health (*see cut*). Cochrane, discussing the use of disinfectants to control poliomyelitis, pointed out the part sanitation is thought to play in controlling the disease. His main concern, however, was to emphasize the possibilities of chemotherapy in polio control—possibilities that are currently far from realized.

And to Talk About: Besides the topics of the official papers, specialties makers found plenty to cover. Aerosolers, for example, noted a major price

Another new development using

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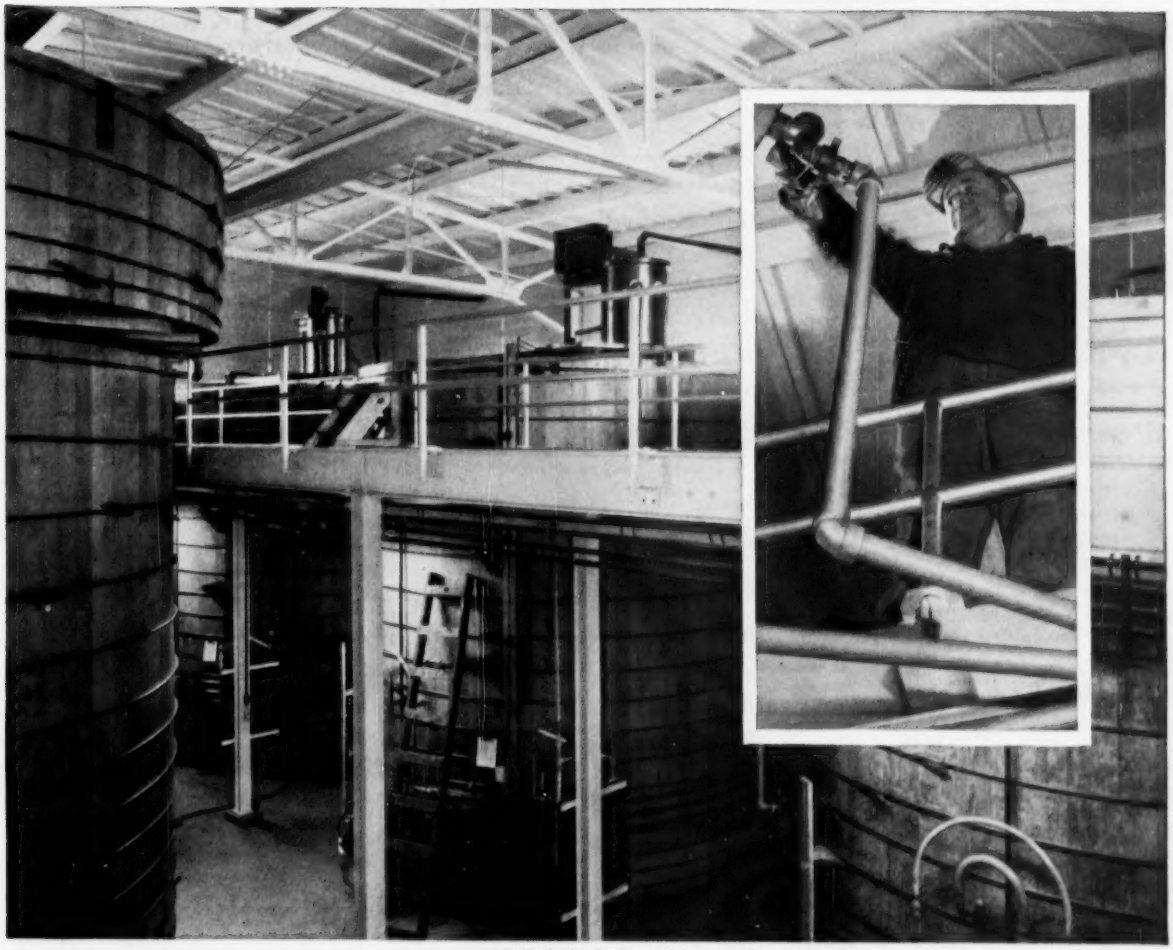

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Rigid vinyl pipe pays off in vinegar plant

MANUFACTURING and processing 100-grain vinegar—strong enough to eat holes in steel—means high plant piping and maintenance costs in many food plants. But a manufacturer in Ohio recently showed how to take the bite out of the problem, by piping his vinegar plant with high impact plastic pipe made from Geon resin.

The plant's new rigid vinyl pipe is lighter in weight, less costly, easier to install than conventional pipe . . . shows extreme resistance to vinegar and acetic acid corrosion, inside and out, even up to 150°F. It is easier to clean and maintain, does not scale, will not deteriorate with aging.

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cut in manufacturing components—Precision Valve knocked nearly 20% off its valve prices by dropping its standard units from $52/1000 to $42/1000.

And among automobile specialties makers, hydraulic brake fluid regulation remains a prime topic. Now the group has reaffirmed its willingness to cooperate with states desiring such laws, but it has outlined its position:

- It approves, in principle, the idea of regulations.
- It favors adoption of "heavy-duty" standard for all fluids.
- It favors the term "brake fluid," (no "hydraulic" needed) on labels, agrees labels should include makers' name.

On the other hand, the group strongly opposes any fees on permitted fluids, and is against submission of samples to state labs for testing.

Pre-meet Luncheon: Although the next meeting of the CSMA is scheduled for New York (Dec. 5, 6, 7 at the Roosevelt Hotel), the group is planning a general membership luncheon for the fall. Listed for Sept. 28 at the Savoy Plaza Hotel in New York, it will precede a board of governors' meeting.

Simple to Stack

Major style change in the familiar "F"-style can is taking place. American, Continental and Crown Can have just introduced their stackable versions of these widely used containers.

The stacking feature is simply achieved: the nozzle, generally positioned on one side of the container top, has been moved to top center; base of the can has a center-positioned recess for the spout of the other can. Result: a container that rests securely on other units of the same size (with old-style designs, top can had to be inverted to stack).

The new cans are particularly well suited for consumer products, since the labeling is always upright, and legible to the buyer. Further, the stacking cans require less shipping volume than previous models.

Crown credits Herman Reinhardt, Jr., of Boyle-Midway, Inc. (division of American Home Products Corp.) with the invention of the new can. It is being used now for Boyle-Midway's Aerowax floor polish and Black Flag insecticide, and it will be used for other household products soon.

AEROSOL AND PRESSURIZED PRODUCTS SURVEY—1954
Chemical Specialties Manufacturers Association, Inc.

Number of units by the sizes indicated for each of the products listed, packed by 53 companies in 1954, including government contracts.

Product	Number of Units Packed		
	Twelve Ounce	Six Ounce and less	TOTAL
Space insecticides	27,208,183	2,346,561	30,090,644*
Residual insecticides—Roach and ant sprays, etc.	6,437,189	223,908	6,661,097
Mothproofers	6,332,115	95,214	6,427,329
Room deodorants	7,492,464	9,710,590	17,203,054
Pigmented and metallic paints	7,385,215	818,472	8,203,687
Clear plastic sprays	1,257,476	96,137	1,353,613
Other household products—waxes, insect repellents, water repellent, rug shampoo, etc.	1,884,509	1,224,063	3,108,572
Shaving lather	5,109,819	37,184,809	42,294,628
Other personal products—shampoos, perfumes, personal deodorants, etc. in metal and glass	12,188,129	28,190,994	40,379,123
Medicinals and pharmaceuticals	609,502	524,903	1,134,405
Snow—all types	5,024,165	1,059,231	6,083,396
Miscellaneous products—dog sprays, mildew preventives, lubricants, ignition spray, antistatic spray, etc.	4,465,851	1,867,169	6,422,556†
TOTAL	85,394,617	83,342,051	169,362,104

* Includes high-pressure units: 535,900 space insecticides.
† Includes high-pressure units: 89,536 miscellaneous products.

Aerosols: Pressured Growth

The sort of pressure every manufacturer would like to feel—consumer pressure—is pushing aerosol sales steadily toward the $200 million/year mark. And as the latest product survey (the CSMA's fourth on aerosols) shows, they have almost reached that mark now. With some 53 companies (of 105 checked) reporting production of 169,362,104 units in 1954, and this figure adjusted by can (216,205,000) and valve (197,079,000) production to 185 million units, the value in 1954 was estimated to be $190 million retail.

The '54 figure represents a third-again increase over 1953—a 45-million boost. Showing particularly impressive gains are the aerosol shave creams: up to 42.3 million units from 24.3 million units in '53. Many of the other pressure-packed products jumped in output last year, too: room deodorants, to 17.2 million from 15.8 million; household products, 3.1 million from 2.3 million.

There were some that slipped, however. Insecticides, although still the largest-selling single item, dropped from about 47 million units to about 43 million (this includes the three classifications on the above table—space insecticides, residuals, and mothproofers). It must be considered, however, that some major insecticide fillers did not report—their figures could substantially lift the 1954 production mark.

Off somewhat too, were the pigmented and metallic paints, down to 8.20 million from 8.26 million, and the clear sprays, 1.35 million from 2.36 million. Snow fell from 8.9 million to 6.1 million units.

Size Switch: Industry authorities emphasize several other points to be

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SOME of today's most popular plastics have the annoying habit of stiffening to the point of brittleness at frigid temperatures. That can be a real headache to makers of products like military tarpaulins for arctic bases, or even ordinary plastic refrigerator bags. To solve this problem, Pittsburgh Coke & Chemical provides the plastics industry with special vinyl plasticizers which give finished plastic products good flexibility even at low temperatures.

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gleaned from the survey: Six-ounce containers are now almost the equal, in sales, of 12-oz. units. Some of this has been due to the giant leap of shaving creams (most are in 6-oz. cans). Part has been due to growth of other personal products—hair lacquers, for example, are also generally packed in the smaller containers, and are now probably the No. 3 product.

As in previous surveys, the accounting firm of Ernst and Ernst received all replies to questionnaires, and destroyed the returns after figures had been noted. This year's survey was actually three in one. Some 13 valve makers contributed figures, 3 container makers, and 53 fillers.

HOSING RAFT: Before 2-month trip to mill, sodium arsenite rids raft of teredos.

Boring Problem

Sometimes you find that old, discarded answers weren't so bad after all—it was just the problem that was wrong. Years ago discouraged researchers gave up trying to protect dock pilings from marine borers (teredos) with sodium arsenite because it wasn't permanent. It killed the borers that were there, all right, but a new crop would come and they had the job to do over again.

But when the borers brought disheartened West Coast loggers a million-dollar-annual loss, lumbermen found they had the "right" problem. Temporary protection is all that's needed for felled trees because borers damage the logs only during their raft trip to the mills. Sodium arsenite, the British Columbia Reasearch Council says, is the best product it has found in its five-year hunt for protection against borers.

Rafts of Borers: Timber is sent from the Queen Charlotte Islands (just below Alaska's Alexander Archipelago) down-coast to sawmills around Vancouver in so-called Davis rafts. The rafts are huge (400 ft. long) bundles of logs which draw 20 ft. of water and comprise 2 million board ft. of lumber. On the long trip down, taking to two months, the teredine borer (*bankia setacea*) digs into the most valuable part of the log (the sappy, clear outer section), grows, bores and destroys as much as 10% of the timber. Damage of $10,000 or more is sometimes wreaked on a single raft during this journey.

Sneak Up on Them: Paul Trussell, chief of the Research Council's division of applied biology, and his researchers tried percussion, electric shock, sonics, chlorine produced electrolytically from sea water, and 100 other chemical compounds and found them all incapable of producing the total teredo kill required.

A 100% kill is necessary because, if any borers are left, they grow until in the end they do nearly as much damage as if all had survived. So, although a few of the methods tried were successful to some extent, the problem remained.

One big trouble is that the borers seem able to detect the presence of most chemicals and avoid absorbing them. Sodium arsenite is one of the few substances that can catch them unaware. Other arsenite advantages: it's commercially available and inexpensive ($500 treats one raft).

Sea Spray: A 25 parts/million solution in sea water is sprayed over the raft and allowed to percolate through interstices between the logs, killing young teredos before they have a chance to grow to harmful size (up to 3 ft. long).

The killing power of the treatment is attested to by the fact that in tests considerable killing took place in the untreated control section where the solution had spread. In practice, a raft receiving a single treatment at the start reaches destination with only two or three logs at the bottom infested (even here new penetration is less than ¾ in. in three months). None of the interior logs shows evidence of reinfestation.

Flat rafts are also used in floating the logs to the mills, and these are treated with a 70 parts/million sodium arsenite solution. Logs for flat rafts are soaked in ponds. Treatment of a standard seven-section flat raft (worth up to $10,000) costs about $100. A seven-hour soak produces the required 100% kill.

In the Long Run: Although all timber indigenous to the temperate coasts of North America responds to sodium arsenite, it isn't a panacea to West Coast borer problems. The treatment only kills the one "crop" of teredos, it doesn't protect indefinitely. The standard, pressure-impregnated creosoted piling still offers the best protection for sea-water wharves and docks.

Trussell and his crew are still working on a permanent protection. They are also working on ways to improve the treatment of rafts—by making it possible to treat flat rafts in open water, for example.

Teredo larvae, which must get themselves into wood within 30 days or die, may find themselves jumping from the frying pan into the fire soon. Meanwhile, West Coast lumbermen will be saving thousands of dollars—and part of it will be going to sodium arsenite makers.

Popping with Energy: A soda pop with extra measures of glucose is being pushed in Canada as a remedy for exhaustion, nausea and poor appetite. Old in England, new in Canada, not sold in the U.S., Lucozade contains 23.5% glucose for energy, lactic acid, sodium benzoate, and assorted flavorings to make it palatable. Selling well through drugstores, it is a product of Harold F. Ritchie & Co., Ltd. (Weston, Ont.).

•

Grease Gone: Swish, made by Montgomery Chemical Co. (Jenkintown, Pa.), softens and loosens grease and oil deposits on machinery. The aerosol contains no acids or alkali and can be used on painted surfaces, clothing and upholstery. The loosened grease can be removed with water.

•

For Old-Fashioned Dishwashers: A silicone lotion to protect housewives' hands while doing dishes, laundry, dusting, painting or waving hair is being sold by Rexall Drug Stores. Cara Nome is said to shield the skin from harsh detergents, grease and grime during household chores. The silicone ingredient, by General Electric, helps ward off water-borne irritants.

Abandoned Art: Devoe & Raynolds Co. (Louisville, Ky.) has disposed of its art-materials division to Craftint Manufacturing Co. (Cleveland, O.). Details of the transaction were not revealed; D & R said the move was to permit it to concentrate on other paint materials.

•

You Patch It: Tubeless tires have created a different kind of market for tire-repair kits. One of the new ones is Lee Tire & Rubber Co.'s unit, selling for $3.98—tire can be fixed without removing from rim. Distribution is through auto stores.

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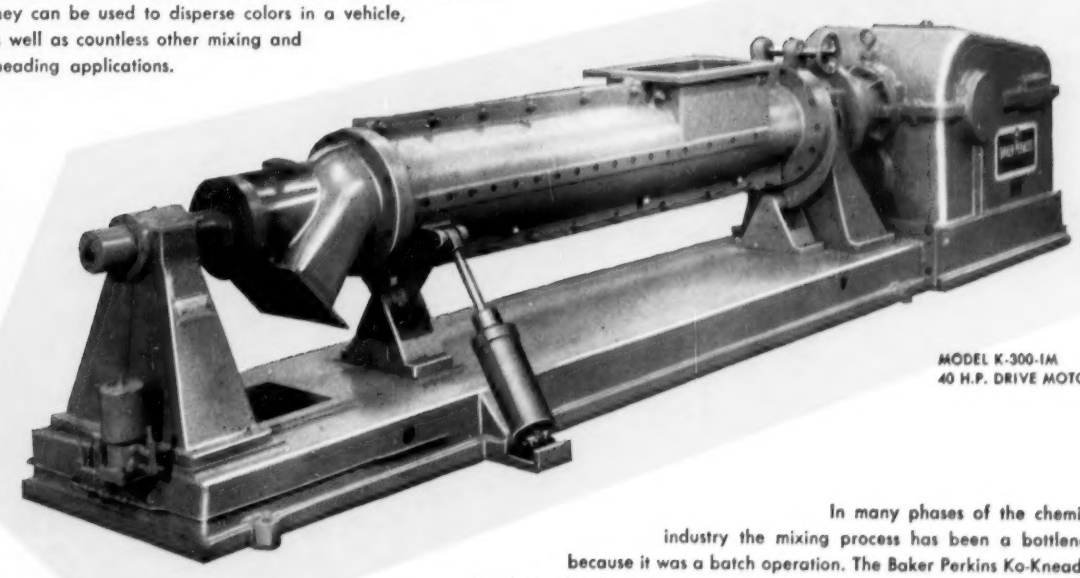

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